

EXHIBIT B48

1 IN THE UNITED STATES DISTRICT COURT
2 FOR THE DISTRICT OF NEW JERSEY3
4 IN RE: JOHNSON & JOHNSON)
5 TALCUM POWDER PRODUCTS)
6 MARKETING SALES)
7 PRACTICES, AND PRODUCTS)
8 LIABILITY LITIGATION) MDL NO.16-2738 (FLW) (LHG)9
10 VIDEO-RECORDED DEPOSITION OF
11 WILLIAM E. LONGO, PH.D.12 February 5, 2019
13 10:24 a.m.14 Suite 100
15 11555 Medlock Bridge Road
16 Johns Creek, Georgia17
18 Frances Buono, RPR, CCR-B-791
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24
25 On behalf of the Defendant,
3 Johnson & Johnson and Johnson & Johnson Consumer
4 Inc.:5 ALEX V. CHACHKES, Esq.
6 NINA TROVATO, Esq.
7 Orrick, Herrington & Sutcliffe, LLP
8 51 West 52nd Street
9 New York, New York 10019-1642
Achachkes@orrick.com
Ntrovato@orrick.com10 JACK N. FROST, JR., Esq.
11 Drinker Biddle & Reath LLP
12 600 Campus Drive
Florham Park, New Jersey 07932-1047
Jack.frost@dbr.com13 On behalf of the Defendant,
14 Imerys Talc America, Inc.:15 MARK K. SILVER, Esq.
16 Coughlin Duffy, LLP
17 350 Mount Kemble Avenue
Morristown, New Jersey 07962
Msilver@coughlinduffy.com18 MARK A. PROST, Esq.
19 Sandberg Phoenix & von Gontard, P.C.
20 600 Washington Avenue
15th Floor
St. Louis, Missouri 63101-1313
Mprost@sandbergphoenix.com

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2 APPEARANCES OF COUNSEL

1
2
3 On behalf of the Plaintiffs:4 LEE CIRSCH, Esq.
The Lanier Law Firm
5 21550 Oxnard Street
3rd Floor
6 Woodland Hills, California 91367
Lee.cirsch@lanierlawfirm.com7
8 P. LEIGH O'DELL, Esq.
Beasley Allen Law Firm
9 218 Commerce Street
Montgomery, Alabama 36103-4160
Leigh.odell@beasleyallen.com10
11 MICHELLE A. PARFITT, Esq.
JAMES GREEN, Esq.
Ashcraft & Gerel, LLP
12 1825 K. Street
Suite 700
13 Washington, D.C. 20036
Mparfitt@ashcraftlaw.com14
15 DENNIS M. GEIER, Esq.
Cohen Placitella Roth, PC
16 127 Maple Avenue
Red Bank, New Jersey 07701
Dgeier@cprlaw.com

4 APPEARANCES OF COUNSEL (continued)

1
2
3 On behalf of the Defendant,
4 Imerys Talc America, Inc.:5 ROBERT A. RICH, Esq.
6 Gordon & Rees Scully Mansukhani
1111 Broadway
7 Suite 1700
Oakland, California 94607
Rrich@grsm.com8 On behalf of the Defendant,
9 PTI:10 MICHAEL ANDERTON, Esq.
Tucker Ellis, LLP
11 950 Main Avenue
Suite 1100
12 Cleveland, Ohio 44113-7213
Michael.anderton@tuckerellis.com13
14 On behalf of the Defendant,
PCPC:15 REBECCA WOODS, Esq.
16 Seyfarth Shaw
17 1075 Peachtree Street, NE
Suite 2500
Atlanta, Georgia 30309
Rwoods@seyfarth.com18
19 Also Present:

20 George Montiel, Videographer

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10:24:58 1 turns out that it is material that if we had
 10:25:00 2 gotten earlier we would have asked about today,
 10:25:03 3 we are going to recall the witness.
 10:25:06 4 MS. O'DELL: Well, we would object to any
 10:25:08 5 motion to hold the deposition open. The
 10:25:10 6 requests that were made for data that was
 10:25:13 7 supplied on Saturday and earlier in the week
 10:25:17 8 were late requests, actually only received five
 10:25:22 9 or I think it was seven days beforehand, they
 10:25:23 10 were timely produced, and you've had sufficient
 10:25:26 11 time to review them.

10:25:27 12 The supplement that you're referring to
 10:25:28 13 that was produced on Sunday corrected a couple
 10:25:32 14 of typographical errors and clarified the
 10:25:37 15 identification of a sample, none of which is
 10:25:40 16 sufficient to hold the deposition open, so we
 10:25:42 17 are going to oppose any such motion. Today's
 10:25:46 18 your opportunity to depose Dr. Longo on these
 10:25:48 19 samples.

10:25:49 20 MR. CHACHKES: Obviously, we disagree, and
 10:25:51 21 we thought that material should have been
 10:25:53 22 produced and we should not have to fight for it,
 10:25:56 23 but it's a fight for another day.

10:25:58 24 So we've premarked some exhibits, some
 10:26:00 25 things I'm sure we will be coming back to later.

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10:26:49 1 So Exhibit 2 is your January 16 expert
 10:26:54 2 report in this matter minus the backup data that was
 10:26:57 3 attached to it when it was produced; is that correct?
 10:27:00 4 A. Yes, sir.
 10:27:00 5 Q. Okay. And then Exhibit 3 is your
 10:27:06 6 November 14 report in this matter which was, I
 10:27:09 7 assume, superseded by Exhibit 2; correct?
 10:27:12 8 A. Correct.
 10:27:12 9 (Defendants' Exhibits 4, 5, and 6 were
 10:27:13 10 marked for identification.)
 10:27:13 11 Q. (By Mr. Chachkes) Okay. What's been
 10:27:15 12 marked as Exhibits 4, 5 and 6, can you confirm that
 10:27:19 13 these are ISO 22262-1, -2, and -3?
 10:27:29 14 A. Yes, sir.
 10:27:30 15 Q. So 1 will be 4, 2 will be 5, and 3 will be
 10:27:37 16 6.
 10:27:37 17 (Defendants' Exhibit 7 was marked for
 10:27:37 18 identification.)
 10:27:43 19 Q. (By Mr. Chachkes) And then what's been
 10:27:45 20 marked as Exhibit 7 is your second supplemental
 10:27:52 21 report minus the backup data that was attached to it
 10:27:56 22 dated February 1, 2019; is that correct?
 10:28:00 23 A. Yes, sir.
 10:28:00 24 Q. And it's my understanding that this report
 10:28:05 25 supersedes what's been marked as Exhibit 2; is that
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10:26:02 1 What I want to do is maybe just go through those
 10:26:04 2 quickly so they are on the record.
 10:26:04 3 (Defendants' Exhibit 1 was marked for
 10:26:06 4 identification.)
 10:26:08 5 Q. (By Mr. Chachkes) Dr. Longo, you can
 10:26:08 6 confirm what's been marked as Exhibit 1 is your CV;
 10:26:08 7 is that correct?
 10:26:15 8 A. Yes, sir.
 10:26:15 9 Q. And are there any updates to this since we
 10:26:17 10 received it?
 10:26:18 11 A. No, sir.
 10:26:18 12 (Defendants' Exhibits 2 and 3 were marked
 10:26:18 13 for identification.)
 10:26:18 14 Q. (By Mr. Chachkes) Okay. What's been
 10:26:20 15 marked as Exhibit 2 is your January 16 expert report
 10:26:30 16 extracted --
 10:26:33 17 MS. O'DELL: November 14.
 10:26:33 18 Q. (By Mr. Chachkes) I'm sorry. What has
 10:26:34 19 been marked as Exhibit 2 is your November 14 expert
 10:26:36 20 report in this matter minus the backup data.
 10:26:39 21 Can you confirm that?
 10:26:40 22 A. This is actually the January 15.
 10:26:43 23 Q. So --
 10:26:46 24 A. November 14 is Exhibit 3.
 10:26:48 25 Q. All right. Let's do that again.

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10:28:12 1 correct? So it supersedes the January report?
 10:28:15 2 A. Yes, sir.
 10:28:17 3 Q. And my understanding is that the only
 10:28:19 4 difference between Exhibit 7 and Exhibit 2 is
 10:28:21 5 Exhibit 7 corrects some typos?
 10:28:25 6 MS. O'DELL: Object to the form.
 10:28:29 7 THE WITNESS: The second supplement
 10:28:30 8 report, essentially it was to clarification on
 10:28:35 9 the Lee Poye J&J STS samples, 31F and 31G, and
 10:28:43 10 it is J&J sample -- hold on, I want to get the
 10:28:53 11 right numbers. Throws me off on two-sided. 77.
 10:29:28 12 Q. (By Mr. Chachkes) That's okay. You've
 10:29:30 13 given me the 31F and 31G. So am I correct in my
 10:29:34 14 understanding that Exhibit 7 does more than correct
 10:29:38 15 typos?
 10:29:39 16 A. Yes. Exhibit 7 does not have any new
 10:29:45 17 analytical data. The two samples that Lee Poye
 10:29:48 18 had -- and I will just give the numbers -- the 31F
 10:29:52 19 and the 31G I misunderstood. I thought that was
 10:29:54 20 actually two samples from the same container.
 10:29:57 21 It's actually one sample from two
 10:30:00 22 different containers. The STS in it looks like a
 10:30:03 23 gift wrapped for the spice and the regular. So
 10:30:06 24 that's actually two containers for each sample. So
 10:30:11 25 the number of containers was increased.

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10:30:13 1 **But the analytical data had been already**
 10:30:16 2 **produced. Nothing changed in the analytical data.**
 10:30:19 3 **And then we had some typos that we endeavored to**
 10:30:24 4 **correct.**

10:30:24 5 Q. Okay. And those are typos you found or
 10:30:26 6 that counsel found?

10:30:29 7 MR. CIRSCH: Object to form.
 10:30:31 8 THE WITNESS: Well, one of them counsel
 10:30:33 9 found, and that was the counsel for Johnson &
 10:30:35 10 Johnson, at my previous deposition on MDL.
 10:30:37 11 There were some positive samples on a chart that
 10:30:40 12 were negative in the overall data, so I decided
 10:30:43 13 to go through and make sure everything was
 10:30:45 14 correct again.

10:30:47 15 Q. (By Mr. Chachkes) What about the other
 10:30:48 16 typos, you found those or counsel?

10:30:52 17 MR. CIRSCH: To the extent -- I would not
 10:30:53 18 have you reveal, Dr. Longo, anything that's work
 10:30:56 19 product is protected under Rule 26. But if you
 10:30:58 20 can answer aside from that, please do.

10:31:01 21 THE WITNESS: No, counsel did not
 10:31:02 22 participate in helping to find typos.

10:31:04 23 Q. (By Mr. Chachkes) Okay. So you found
 10:31:05 24 them personally?

10:31:06 25 **A. Personally and Dr. Rigler.**

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10:32:20 1 MR. CHACHKES: So which ones, then?
 10:32:22 2 MS TROVATO: December 12 is 10.
 10:32:23 3 Q. (By Mr. Chachkes) Okay. So December 12
 10:32:23 4 is Exhibit 10; is that correct?

10:32:26 5 A. **Yes.**
 10:32:28 6 Q. Okay. You should probably look at your
 10:32:30 7 own copies, not mine.

10:32:31 8 A. **Did I get a copy?**

10:32:33 9 Q. Yes, you did.

10:32:34 10 A. **Okay. Sorry.**

10:32:35 11 **Yes, that's correct.**

10:32:36 12 Q. Okay. And Exhibit Number 11, we
 10:32:40 13 premarked, is another letter from J3 dated
 10:32:44 14 December 20 to you; correct?

10:32:46 15 A. **Correct.**

10:32:46 16 Q. All right.

10:32:52 17 MR. CIRSCH: I'm sorry again, but
 10:32:55 18 Exhibit 10 I have says December 20 as well, so
 10:32:57 19 maybe that's -- okay. I just got two of them.
 10:33:00 20 Never mind.

10:33:04 21 Q. (By Mr. Chachkes) You received your
 10:33:06 22 doctor's in philosophy in materials science and
 10:33:08 23 engineering; correct?

10:33:10 24 A. **Yes.**

10:33:10 25 Q. You're not a geologist?

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 1 (Defendants' Exhibits 8, 9, 10, and 11
 10:31:08 2 were marked for identification.)
 10:31:08 3 Q. (By Mr. Chachkes) Okay. And now
 10:31:09 4 Exhibit 8, if you would look at that, if you could
 10:31:12 5 confirm, is the January 31 quality control -- quality
 10:31:19 6 assurance report that you created in this case?

10:31:22 7 **A. Yes, sir.**

10:31:22 8 Q. Okay. And then Exhibit 9, which is more
 10:31:28 9 for the record than you because you can't confirm it,
 10:31:30 10 it is a USB with the three reports in this case, the
 10:31:36 11 November 1, the January 1, and the recent -- sorry.
 10:31:42 12 Okay. So it is November, January, and the March 2018
 10:31:46 13 report are all in full on Number 9. It's just too
 10:31:50 14 much paper so we put it on the USB.

10:31:52 15 Can you confirm that Exhibit Number 10 is
 10:31:59 16 a letter to you from J3 dated December 12, 2018,
 10:32:04 17 about the MAS split of 21 historic talc samples by
 10:32:13 18 XRD?

10:32:14 19 MR. CIRSCH: It's actually December 20.

20 MR. CHACHKES: What did I say?

21 MR. CIRSCH: December 12.

22 Q. (By Mr. Chachkes) I'm sorry. So it's
 23 December --

24 MS. TROVATO: No, you're right. You're
 25 right.

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 10:33:12 1 A. **I am not a geologist.**
 10:33:13 2 Q. You're not a mineralogist?

10:33:15 3 A. **I did not take any courses in mineralogy.**

10:33:17 4 Q. Do you consider yourself an expert in
 10:33:19 5 mineralogy?

10:33:20 6 A. **Usually that's up to the courts.**

10:33:22 7 **Certainly I believe I have more knowledge than the**
 10:33:25 8 **average layperson, but I do not hold myself out with**
 10:33:28 9 **any degrees in mineralogy.**

10:33:29 10 Q. Okay. You're not a certified industrial
 10:33:31 11 hygienist?

10:33:31 12 A. **No, I'm not.**

10:33:33 13 Q. You've done exposure assessments, though;
 10:33:36 14 correct?

10:33:37 15 A. **Yes.**

10:33:37 16 Q. All right. You're an expert in exposure
 10:33:41 17 assessments?

10:33:42 18 A. **Again, I'm not sure what that means. I**
 10:33:45 19 **certainly have done a number of studies in which we**

10:33:48 20 **have determined typical exposures from both**
 10:33:52 21 **asbestos-added construction industrial products as**

10:33:56 22 **well as what I call hygiene exposure studies**

10:33:59 23 **involving Johnson & Johnson cosmetic talc samples.**

10:34:04 24 **Published on our exposure assessments in**
 10:34:06 25 **the past. We use all standard protocols that are**

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10:34:13 1 accepted by the community of scientists who do this
 10:34:17 2 type of work. Been qualified many times in court as
 10:34:20 3 an industrial hygienist specifically to asbestos.
 10:34:23 4 So again, I have probably more knowledge
 10:34:26 5 than the average layperson on doing exposure
 10:34:29 6 assessment type studies involving asbestos.
 10:34:32 7 Q. When a plaintiff has been exposed to
 10:34:34 8 multiple different talc-based products, each of which
 10:34:37 9 could possibly contain asbestos, is it best to
 10:34:40 10 analyze the asbestos content of each product?

10:34:43 11 MR. CIRSCH: Object to form.

10:34:46 12 THE WITNESS: I'm not sure it's required
 10:34:48 13 to analyze each product. You will have to
 10:34:51 14 clarify. Do you mean each different
 10:34:53 15 manufacturer or from different talc sources,
 10:34:57 16 such as the Italian or the Vermont or Montana?

10:35:02 17 Q. (By Mr. Chachkes) Let's say different
 10:35:03 18 manufacturers. Let's say a plaintiff has been
 10:35:06 19 exposed to talc-based products from three
 10:35:08 20 manufacturers. Is it best to analyze the asbestos
 10:35:10 21 content from each of the three manufacturers?

10:35:13 22 MR. CIRSCH: Object to form.

10:35:15 23 THE WITNESS: Certainly we try to do that;
 10:35:16 24 but if three manufacturers all have to use the
 10:35:22 25 talcum powder source is Italy, Italian, I think

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10:36:34 1 of the asbestos exposure came from which talc, would
 10:36:37 2 you need to analyze all three?
 10:36:39 3 MR. CIRSCH: Object to form.
 10:36:40 4 THE WITNESS: Again, that's an incomplete
 10:36:41 5 hypothetical. If we had never analyzed any
 10:36:44 6 manufacturer's source of talc from any
 10:36:47 7 particular location, then as I stated earlier, I
 10:36:51 8 would not have an opinion about that particular
 10:36:53 9 manufacturer.

10:36:54 10 If they come from things like, again,
 10:36:57 11 Vermont, Italy, say the Korean mines, then we
 10:37:03 12 have a pretty good understanding of the levels
 10:37:05 13 of amphibole asbestos that are typically found
 10:37:09 14 in the products from those mines.

10:37:11 15 Q. (By Mr. Chachkes) Okay. So you feel
 10:37:12 16 confident that you can testify to the amount of
 10:37:16 17 amphiboles you expect in a bottle based solely on the
 10:37:19 18 geography from which the bottle comes?

10:37:23 19 MR. CIRSCH: Object to form.

10:37:24 20 THE WITNESS: I didn't say that.

21 Q. (By Mr. Chachkes) Okay.

10:37:25 22 A. What I would say is we have analyzed a
 10:37:27 23 number of samples from other manufacturers, two
 10:37:32 24 different manufacturers, three different
 10:37:33 25 manufacturers, where, say, the source is Italy, so I

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10:35:26 1 you can imply that if one manufacturer's Italian
 10:35:30 2 talc has measurable levels or detectable levels
 10:35:35 3 of amphibole asbestos, then the other
 10:35:40 4 manufacturer more likely than not would have
 10:35:41 5 similar types of concentrations, depending on
 10:35:44 6 their processing flotation, et cetera.

10:35:46 7 If you have different manufacturers from
 10:35:49 8 completely different mines and you haven't
 10:35:51 9 analyzed anything from the particular talc mine,
 10:35:54 10 which has happened to me in the past, I
 10:35:56 11 typically say I don't have any opinions.

10:35:58 12 Q. (By Mr. Chachkes) Okay. If you're trying
 10:36:01 13 to determine which manufacturer's talc contributed
 10:36:04 14 what level of exposure to asbestos, do you need to
 10:36:09 15 analyze all the different manufacturers' products?

10:36:13 16 MR. CIRSCH: Object to form.

10:36:15 17 THE WITNESS: Again, it depends on who the
 10:36:16 18 manufacturer is. It's sort of an incomplete
 10:36:19 19 hypothetical.

10:36:19 20 Q. (By Mr. Chachkes) Okay. Let me complete
 10:36:20 21 it, then.

10:36:22 22 So hypothetically, if there's three
 10:36:23 23 manufacturers each from a different geological
 10:36:26 24 location, if you're trying to determine the exposure
 10:36:29 25 of a plaintiff, do you need to -- and what percentage

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10:37:36 1 know that there will be significant concentrations in
 10:37:39 2 some percentage of the samples.

10:37:40 3 Q. Okay. So let's say you have three bottles
 10:37:43 4 from three geographical locations that you haven't
 10:37:46 5 analyzed in the past. Do you need to analyze each
 10:37:48 6 bottle to determine the percentage of asbestos
 10:37:51 7 exposure per manufacturer?

10:37:55 8 MR. CIRSCH: Object to form.

10:37:56 9 THE WITNESS: When you say each bottle, I
 10:37:58 10 have five from each or two from each or ten from
 10:38:01 11 each?

10:38:01 12 Q. (By Mr. Chachkes) So does it matter?

10:38:04 13 A. I don't know. I mean, it's a
 10:38:07 14 hypothetical. If we had not tested any samples from
 10:38:10 15 any particular geological location, I would not
 10:38:15 16 provide opinions on any -- the potential for
 10:38:18 17 amphibole asbestos, regulated amphibole asbestos to
 10:38:21 18 be in those containers.

10:38:22 19 Q. Would you agree it's important to at least
 10:38:28 20 determine a plaintiff's exposure to asbestos on a
 10:38:31 21 comparative basis if there were multiple sources of
 10:38:36 22 exposure?

10:38:38 23 MR. CHACHKES: Object to form.

10:38:41 24 THE WITNESS: Depends on the information.
 10:38:43 25 If the particular plaintiff says I use

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1 manufacturer X, manufacturer Y, manufacturer Z,
 2 and I used them all 33.33 percent each and they
 3 all come from the same geological formation of
 4 where cosmetic talc is being used in those
 5 containers, then my opinion would be if it is a
 6 geological location that we have tested in the
 7 past, that they would all have similar -- that
 8 the manufacturers would have similar exposures.

9 If one of the manufacturers was, well,
 10 I've got a gift -- for example, if I got a gift
 11 bag once a year and I would use it and that's
 12 all, then I would say that the primary exposure
 13 is from the other manufacturers.

14 So it just depends on the circumstances.

15 Q. (By Mr. Chachkes) Okay. You're not a
 16 pathologist?

17 A. **No, sir, I'm not.**

18 Q. You have no medical training?

19 A. **No, sir, I don't have any medical**
 20 **training.**

21 Q. Are you a statistician?

22 A. **I'm not a statistician.**

23 Q. Are you a geostatistician?

24 A. **I'm not that kind of statistician either.**

25 Q. Okay. So in light of the reports that we

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10:40:55 1 MR. CIRSCH: Object to form.

10:40:56 2 THE WITNESS: I don't recall the exact
 10:40:57 3 words, no.

10:40:57 4 Q. (By Mr. Chachkes) Okay. Do you agree
 10:40:58 5 that if you want to know whether there's asbestos in
 10:41:00 6 talc, you would go to either your lab or Lee Poye's
 10:41:03 7 lab and that's it?

10:41:04 8 MR. CIRSCH: Object to form.

10:41:05 9 THE WITNESS: It depends on the
 10:41:06 10 circumstances. If you're going to understand
 10:41:09 11 what's your best opportunity to see and get the
 10:41:12 12 appropriate detection limits, I'm only aware of
 10:41:16 13 Lee Poye and our lab that use routinely the
 10:41:21 14 heavy liquid density separation method.

10:41:22 15 There may be other labs out there doing
 10:41:24 16 it, but that's the only two I know at the
 10:41:26 17 moment.

10:41:26 18 Q. (By Mr. Chachkes) Okay. So you know of
 10:41:27 19 no other labs besides yours and Lee Poye that can
 10:41:32 20 accurately determine whether there's asbestos in
 10:41:35 21 talc, at least using the concentration method?

10:41:38 22 MR. CIRSCH: Object to form.

10:41:39 23 THE WITNESS: Accurately determine? It's
 10:41:41 24 all about getting the best analytical
 10:41:44 25 sensitivity. So analytical sensitivities and

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10:39:50 1 have in this case, are you here to testify in your
 10:39:53 2 capacity as a microscopist; is that accurate?

10:39:57 3 MR. CIRSCH: Object to form.

10:39:58 4 THE WITNESS: I'm here to testify on the
 10:40:01 5 qualifications I have and have been accepted in
 10:40:03 6 the past. I'm a material scientist; I'm an
 10:40:07 7 industrial hygienist; I have many expertise in
 10:40:10 8 the analysis of asbestos.

10:40:13 9 My testimony in the past has been that any
 10:40:17 10 particular types of manufacturers where we have
 10:40:21 11 analyzed the talc and we have analyzed the
 10:40:24 12 source -- know the source, that more likely than
 10:40:28 13 not there would have been a significant exposure
 10:40:32 14 based on the percentages of the samples that are
 10:40:34 15 positive. That's as far as I go.

10:40:36 16 Q. (By Mr. Chachkes) You've testified in the
 10:40:38 17 past the following: In my opinion, if you want to
 10:40:41 18 know if there's asbestos in talc, you would go to
 10:40:44 19 either our lab or Lee Poye's lab and that's it.

10:40:47 20 Do you recall that testimony?

10:40:49 21 MR. CIRSCH: Object to form. Do you have
 10:40:51 22 a copy of the testimony you can show the
 10:40:53 23 witness?

10:40:53 24 Q. (By Mr. Chachkes) Do you recall that
 10:40:55 25 testimony?

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10:41:48 1 using the non-heavy liquid density separation
 10:41:50 2 method for TEM is usually in the low to 10 to 12
 10:41:59 3 million fibers per gram.

10:42:01 4 The heavy liquid density separation can
 10:42:04 5 reduce that; at least in our lab we have gotten
 10:42:06 6 as low as 3,000 fibers/bundles per gram. I know
 10:42:11 7 the R.J. Lee Group used the Blount heavy density
 10:42:16 8 liquid separation method once for TEM. There is
 10:42:19 9 an ISO protocol for it, so there may be other
 10:42:21 10 labs that I'm not aware of.

10:42:23 11 Q. (By Mr. Chachkes) So are you the only
 10:42:24 12 lab -- you and Lee Poye -- who can detect 3,000
 10:42:29 13 structures per gram?

10:42:32 14 MR. CIRSCH: Object to form.

10:42:34 15 THE WITNESS: I don't know. Anybody
 10:42:35 16 following the heavy liquid density measurement
 10:42:37 17 technique should be able to achieve detection
 10:42:39 18 limits --

10:42:41 19 Q. (By Mr. Chachkes) Okay.

10:42:39 20 A. **-- as such.**

10:42:40 21 Q. So your opinion about the high
 10:42:43 22 qualifications of your lab and Lee Poye's lab, it's
 10:42:45 23 not based on different methodologies; it's just based
 10:42:48 24 on your opinion that you do it better?

10:42:50 25 MR. CIRSCH: Object to form.

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10:42:51 1 THE WITNESS: Well, it's not really doing
 10:42:52 2 it better; it's just following the appropriate
 10:42:54 3 protocol for the analytical sensitivities.
 10:42:57 4 There may be other labs out there. John
 10:43:00 5 Fitzgerald's lab may be doing it now. I don't
 10:43:01 6 know.
 10:43:03 7 Q. (By Mr. Chachkes) Okay.

10:43:04 8 A. **That's the only two I'm aware of that are**
 10:43:06 9 **routinely doing it now.**

10:43:07 10 Q. MAS has been testing talc for asbestos by
 10:43:11 11 TEM since 2017; is that correct?

10:43:14 12 MR. CIRSCH: Object to form.

10:43:16 13 THE WITNESS: We have been testing
 10:43:17 14 cosmetic talc since early 2017. We have tested
 10:43:21 15 industrial talc all the way back to the 1990s,
 10:43:27 16 early 2000s.

10:43:28 17 Q. (By Mr. Chachkes) MAS has been testing
 10:43:32 18 talc for asbestos by PLM since about October of 2018;
 10:43:36 19 is that correct?

10:43:36 20 MR. CIRSCH: Object to form.

10:43:41 21 THE WITNESS: I don't know when we got
 10:43:43 22 started testing industrial talc for PLM.

10:43:46 23 Probably way back in the 1990s, early 2000s.

10:43:51 24 We've recently started analyzing cosmetic
 10:43:56 25 talc using the ISO 22262-1 and the Blount PLM

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10:44:05 1 method enhanced, not your typical analysis. I
 10:44:11 2 don't know when we got started last year.
 10:44:13 3 Q. (By Mr. Chachkes) Okay. Is it possible
 10:44:16 4 you didn't start looking at cosmetic talc by PLM
 10:44:19 5 until October of 2018?

10:44:21 6 MR. CIRSCH: Object to form.

10:44:23 7 THE WITNESS: Well, unless I can go and
 10:44:24 8 look and verify, all I can say is I don't recall
 10:44:26 9 when we started analyzing cosmetic talc by PLM.

10:44:31 10 Q. (By Mr. Chachkes) Have any academic
 10:44:33 11 institutions endorsed MAS as one of the best labs in
 10:44:37 12 the world to test talc?

10:44:39 13 A. **If they have, they haven't let me know.**

10:44:41 14 Q. Has MAS received any accolades from any
 10:44:44 15 academic institutions for its talc testing?

10:44:47 16 A. **Not that I'm aware of.**

10:44:49 17 Q. Have any nationally or internationally
 10:44:51 18 renowned TEM scientists identified MAS as one of the
 10:44:55 19 best labs in the world for testing talc?

10:44:58 20 MR. CIRSCH: Object to form.

10:45:01 21 THE WITNESS: I don't know who these
 10:45:03 22 internationally recognized experts are. We're
 10:45:06 23 just following a standard protocol to analyze
 10:45:09 24 talc using the most appropriate sensitivities
 10:45:14 25 for analytical sensitivities.

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10:45:16 1 Q. (By Mr. Chachkes) So you're not aware of
 10:45:17 2 any TEM scientists who's not taking plaintiff
 10:45:23 3 lawyers' money who has recognized MAS as one of the
 10:45:26 4 best labs in the world for testing talc?

10:45:29 5 MR. CIRSCH: Object to form.

10:45:31 6 THE WITNESS: I don't recall any TEM
 10:45:33 7 analyst being paid by plaintiffs' attorneys or
 10:45:37 8 any TEM analyst paid by defense attorneys that
 10:45:38 9 are calling me and saying good job, Bill.

10:45:41 10 Q. (By Mr. Chachkes) Have any nationally or
 10:45:45 11 internationally renowned PLM scientists identified
 10:45:47 12 MAS as one of the best labs in the world for testing
 13 talc?

10:45:48 14 MR. CIRSCH: Object to form.

10:45:50 15 THE WITNESS: I don't know who these
 10:45:52 16 internationally renowned PLM labs are. I do
 10:45:55 17 believe we're -- because of how we've enhanced
 10:45:59 18 the PLM method that we are one of the better
 10:46:04 19 labs because of the time and effort we put into
 10:46:06 20 the analysis. Sort of along the lines of the
 10:46:10 21 proposed PLM method by the FDA in 1973, I think
 10:46:14 22 they said it was laborious.

10:46:16 23 Q. (By Mr. Chachkes) All right. So this is
 10:46:17 24 not a question about what you believe or what people
 10:46:19 25 at MAS believe but a question about what third

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10:46:22 1 parties believe.

10:46:23 2 Are there any nationally or
 10:46:25 3 internationally renowned PLM scientists or any
 10:46:27 4 scientists, for that matter, who have identified MAS
 10:46:30 5 as one of the best labs in the world for testing talc
 10:46:33 6 under PLM?

10:46:34 7 MR. CIRSCH: Object to form.

10:46:35 8 THE WITNESS: I don't know.

10:46:35 9 Q. (By Mr. Chachkes) Have you ever presented
 10:46:37 10 at any conferences about testing talc by TEM?

10:46:40 11 A. **Maybe. Not cosmetic talcs, no.**

10:46:48 12 Q. Okay. When you say maybe, nothing comes
 10:46:51 13 to mind?

10:46:51 14 A. **Well, we have been analyzing industrial
 10:46:54 15 talcs for some time. We have given talks at Johnson
 10:47:00 16 Conferences in the past; Mr. Hatfield has. Any of
 10:47:01 17 that data that may have happened, I just don't know.**

10:47:05 18 Q. Okay. But for conferences that relate to
 10:47:08 19 testing talc with TEM, sitting here today, you can't
 10:47:11 20 recall presenting at any such conference?

10:47:15 21 MR. CIRSCH: Object to form.

10:47:17 22 THE WITNESS: I don't recall.

10:47:17 23 Q. (By Mr. Chachkes) Have you ever presented
 10:47:18 24 at any conference -- sorry, strike that.
 10:47:20 25 Have you ever been invited to present at

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10:47:23 1 any conferences about testing talc with TEM or PLM?
 10:47:26 2 A. Yes, I was.
 10:47:27 3 Q. Okay. What was that?
 10:47:28 4 A. Bruce Bishop invited me to come debate
 10:47:34 5 Dr. Sanchez at a DRI conference last year.
 10:47:37 6 Q. Okay. So did you actually go to that
 10:47:38 7 conference?
 10:47:38 8 A. No.
 10:47:39 9 Q. And DRI conference, that's a defense bar
 10:47:42 10 conference?
 10:47:42 11 A. Yes, sir. I have participated in those
 10:47:45 12 for a number of times and typically debating one of
 10:47:49 13 the defense experts. And he sent an email, and I
 10:47:56 14 couldn't arrange it in my schedule.
 10:47:57 15 Q. The FDA had a conference in November '18
 10:48:01 16 with Jeff San at the University of Maryland; are you
 10:48:03 17 aware of that?
 10:48:04 18 A. I am.
 10:48:05 19 Q. Were you invited to participate?
 10:48:06 20 A. No.
 10:48:06 21 Q. Are you familiar with Forensic Analytical
 10:48:10 22 Labs?
 10:48:10 23 A. I am.
 10:48:11 24 Q. Would you agree that they are an
 10:48:13 25 independent laboratory?

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10:48:14 1 MR. CIRSCH: Object to form.
 10:48:16 2 THE WITNESS: I don't know what their
 10:48:17 3 background is.
 10:48:19 4 Q. (By Mr. Chachkes) Okay. Have you relied
 10:48:20 5 on their testing of talc for asbestos before?
 10:48:24 6 A. I don't know.
 10:48:25 7 Q. Sitting here today, is there any reason
 10:48:29 8 why you believe you shouldn't be able to rely on
 10:48:31 9 their work?
 10:48:32 10 MR. CIRSCH: Object to form.
 10:48:33 11 THE WITNESS: It depends on the work. I
 10:48:35 12 would have to review what work that
 10:48:37 13 hypothetically you want me to rely on.
 10:48:38 14 Q. (By Mr. Chachkes) Yeah. So I'm just
 10:48:40 15 talking about the laboratory, not necessarily the
 10:48:42 16 nature of the science, which of course you'll always
 10:48:46 17 review; right?
 10:48:46 18 So the nature of the laboratory -- and
 10:48:48 19 sitting here today, is there anything about the
 10:48:50 20 Forensic Analytical Labs laboratory that makes you
 10:48:54 21 suspicious of their work in any way?
 10:48:56 22 A. I don't have an opinion one way or the
 10:48:58 23 other. Typically, for me to say something about any
 10:49:00 24 particular lab, I would have to have some interaction
 10:49:04 25 with that lab over the years.

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10:49:07 1 Q. Now, you issued a supplemental report
 10:49:10 2 January 15, 2019; correct?
 10:49:12 3 A. Yes, sir.
 10:49:12 4 Q. Why? What did it add to or subtract from
 10:49:17 5 the first report?
 10:49:18 6 A. There was typos in the first report.
 10:49:21 7 Also, we talked -- added somewhere, I believe, the
 10:49:25 8 Blount PLM that we did on the -- or talked about it
 10:49:33 9 on the 16 containers that Lee Poye tested.
 10:49:39 10 Q. And those errors that you just referred
 10:49:43 11 to, when did you identify them? Was it after you
 10:49:44 12 issued your January 15 report -- I'm sorry, after you
 10:49:47 13 issued your November 14 report?
 10:49:49 14 A. Yes.
 10:49:49 15 Q. And how did you identify those errors?
 10:49:53 16 A. Reading through it. It was very obvious
 10:49:58 17 to me that J3 was not P3, that I had missed it in a
 10:50:03 18 couple of places.
 10:50:04 19 Q. Okay. So the errors that were identified
 10:50:05 20 and fixed in the January 15 report, they were all
 10:50:08 21 identified by you personally?
 10:50:09 22 A. Either myself or Dr. Rigler. I can't tell
 10:50:12 23 you which one of us fixed the most.
 10:50:15 24 Q. Okay. And referring to these additional
 10:50:19 25 data in the January 15 report, did that testing occur

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10:50:23 1 after November 14, 2018?
 10:50:27 2 A. Yes. I believe so.
 10:50:30 3 Q. And then there's a second supplemental
 10:50:32 4 report dated February 1, 2019; correct?
 10:50:35 5 A. Correct.
 10:50:35 6 Q. Okay. And we discussed that before,
 10:50:38 7 didn't we?
 10:50:38 8 A. Yes, sir.
 10:50:39 9 Q. Do you know why it was not produced until
 10:50:47 10 February 2?
 10:50:48 11 MR. CIRSCH: Object to form.
 10:50:52 12 THE WITNESS: Why it wasn't produced until
 10:50:54 13 February 2?
 10:50:55 14 Q. (By Mr. Chachkes) Yeah.
 10:50:56 15 A. Because that's when I sent it.
 10:50:56 16 Q. Okay. You also produced two reports from
 10:51:04 17 Lee Poye at J3 Resources dated December 12 and
 10:51:09 18 December 21; correct?
 10:51:10 19 A. Correct.
 10:51:10 20 Q. Can you describe what those reports are?
 10:51:11 21 A. XRD of 17 MDL samples -- excuse me -- 19
 10:51:21 22 MDL samples to finish off the MDL samples for XRD
 10:51:26 23 that we were going to test. We didn't test the
 10:51:30 24 Windsor railroad car samples for XRD.
 10:51:33 25 Q. And there's some PLM work in there as

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10:51:35	1	well?	10:53:56	1	request in this case with anybody at J3 Resources?
10:51:37	2	A. I don't know.	10:53:59	2	A. No.
10:51:39	3	Q. That's okay. We can get back to that.	10:53:59	3	Q. What measures do you employ to ensure that
10:51:40	4	Do these samples in Lee Poye's	10:54:02	4	J3 Resources provides all the data it generated in
10:51:47	5	supplemental reports relate to -- do they correspond	10:54:06	5	its work for you?
10:51:53	6	to samples in your report?	10:54:07	6	MR. CIRSCH: Object to form.
10:51:54	7	A. Yes.	10:54:08	7	Q. (By Mr. Chachkes) Actually, strike that.
10:51:54	8	Q. How did they -- how can somebody correlate	10:54:09	8	I think we have already done that.
10:51:58	9	the two?	10:54:10	9	All right. Your lab produced something
10:51:59	10	A. Let me see. There should have been a --	10:54:11	10	called global particles tables for a number of
10:52:12	11	let me get some of this stuff out of the way.	10:54:15	11	samples. Does that ring a bell?
10:52:15	12	Q. Actually, you know, let's -- here. Let's	10:54:16	12	A. Yes.
10:52:17	13	go back to 10.	10:54:16	13	Q. Okay. And what are those?
10:52:20	14	Exhibit 10 is the December 12 letter	10:54:21	14	A. That's the raw data for each of the
10:52:23	15	from -- this is mine. You've got one in your stack.	10:54:24	15	particles that were measured and counted.
10:52:25	16	A. Oh, do I?	10:54:26	16	Q. Okay. And so that's the data underlying
10:52:26	17	Q. Yes.	10:54:30	17	what you report in your expert reports?
10:52:27	18	A. Okay.	10:54:33	18	MR. CIRSCH: Object to form.
10:52:32	19	Q. Just the coding system, let's just take	10:54:34	19	THE WITNESS: Not in this expert report,
10:52:34	20	the first one. M69722-001, do you see on the front	10:54:35	20	I'm not relying on it, but in past ones, yes.
10:52:40	21	page?	10:54:37	21	Q. (By Mr. Chachkes) Okay. Because those
10:52:40	22	A. Yes.	10:54:38	22	are non-MDL samples?
10:52:40	23	Q. Do you know what that refers to? Does	10:54:41	23	A. Well, they're non-MDL samples. It's not
10:52:42	24	that coding indicate something to you?	10:54:44	24	so much they're non-MDL samples, but I was under the
10:52:44	25	A. It does. I didn't -- we don't have the	10:54:48	25	impression that these MDL samples weren't contested
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10:52:48	1	key.	10:54:51	1	for chain of custody.
10:52:48	2	What I do is I make an additional number	10:54:52	2	Q. Okay. But what I'm asking, though, is the
10:52:52	3	so that the -- Lee Poye essentially gets blind	10:54:55	3	global particle tables that you produced in this case
10:52:58	4	samples, and there's supposed to be a key produced	10:54:58	4	do not correspond to MDL samples; is that correct?
10:53:00	5	with that.	10:55:03	5	A. That is correct.
10:53:01	6	Q. Okay. You have a key?	10:55:04	6	Q. Okay. Are you able to generate a global
10:53:02	7	A. I don't have it with me. I thought it was	10:55:07	7	particle table for the MDL samples?
10:53:04	8	attached to the report.	10:55:10	8	A. We have not analyzed any MDL samples yet
10:53:05	9	MR. CHACHKES: We ask the plaintiffs to	10:55:13	9	that I'm aware of.
10:53:08	10	produce that key. I don't think we got it.	10:55:13	10	Q. What about the samples in your reports in
10:53:11	11	MS. O'DELL: Okay.	10:55:16	11	this case?
10:53:15	12	Q. (By Mr. Chachkes) Okay. So have you	10:55:16	12	A. Well, they're not particle size analysis.
10:53:19	13	produced all the J3 -- all the data J3 Resources	10:55:20	13	They're PLM and TEM analysis. Those are specifically
10:53:24	14	generated from the work for you in this case?	10:55:25	14	designed for detection of amphibole asbestos, not
10:53:27	15	A. Yes.	10:55:31	15	particle sizing.
10:53:27	16	Q. And did you ask them about what kind of	10:55:32	16	Q. Why did you produce the global particle
10:53:31	17	materials they generated?	10:55:34	17	tables in this case?
10:53:33	18	A. I mean, other than what they sent me, no.	10:55:35	18	MR. CIRSCH: Object to form.
10:53:38	19	Q. Okay. So you didn't ask them whether	10:55:36	19	THE WITNESS: I was asked for it, you
10:53:39	20	there was additional material that they generated but	10:55:39	20	know, in other cases, so I thought I would just
10:53:42	21	just did not provide to you?	10:55:41	21	produce it here, even though I'm not relying on
10:53:44	22	A. No, sir. I have dealt with and had XRD	10:55:43	22	it.
10:53:48	23	done by them before in other reports, and this is	10:55:46	23	Q. (By Mr. Chachkes) Okay. Do you do talc
10:53:51	24	what they provide.	10:55:52	24	particle size analysis for the MDL?
10:53:52	25	Q. Has anyone at MAS discussed the production	10:55:54	25	A. We did not.
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10:55:55 1 Q. All right. But the data in the global
10:56:07 2 particle tables relates to talc particle size?
10:56:12 3 **A. Yes, sir. All the particles for the talc**
10:56:15 4 **sizes that -- in the -- I guess it was in August 4,**
10:56:22 5 **2017, or 2018 report, I can't remember.**

10:56:24 6 Q. Sitting here today, are you aware of any
10:56:27 7 relevance that the global particle tables that you
10:56:30 8 produced have to the reports you issued in this case,
10:56:33 9 the MDL?

10:56:35 10 MR. CIRSCH: Object to form.

10:56:36 11 THE WITNESS: Again, as I'm stating, I'm
10:56:38 12 not relying on it. We did not do any MDL
10:56:40 13 particle sizing. May in the future, but we
10:56:44 14 haven't done it here, and I'm not relying on the
10:56:46 15 report that we issued --

10:56:47 16 Q. (By Mr. Chachkes) Okay.

10:56:49 17 **A. -- in August.**

10:56:50 18 Q. Did your analyst compare any of the
10:56:52 19 particles identified in your MDL report by PLM to
10:56:59 20 compare them with a known asbestos reference sample?

10:57:03 21 MR. CIRSCH: Object to form.

10:57:14 22 THE WITNESS: I don't know. It's not
10:57:16 23 something that we typically require analysts to
10:57:19 24 do, especially the analyst doing this. He's
10:57:23 25 worked for us for almost 30 years; he's a

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10:58:26 1 comparing to a reference sample from some source
10:58:30 2 other than something generated by MAS, are you aware
10:58:33 3 of any of that?
10:58:34 4 MR. CIRSCH: Object to form.
10:58:36 5 THE WITNESS: They have all the references
10:58:38 6 for all the NIST standards that are routinely
10:58:41 7 looked at when we get -- when our lab is audited
10:58:47 8 by the NVLAP, they go around and make sure the
10:58:51 9 analysts can identify these types of materials.
10:58:53 10 So, yes, we have reference materials. You
10:58:56 11 know, did they pull it out or not, as I'm
10:58:59 12 sitting right here specifically, but they do do
10:59:01 13 that periodically. So that's all I can tell
10:59:05 14 you.
10:59:05 15 Q. (By Mr. Chachkes) Okay. So you have NIST
10:59:07 16 samples, but you don't know whether your PLM
10:59:09 17 scientist actually compared the PLM work he did in
10:59:13 18 this case to those NIST samples for this case?
10:59:18 19 **A. Specifically for these MDL samples did he**
10:59:23 20 **pull out the standards or just use the standard**
10:59:27 21 **crystallographic information that's specific for the**
10:59:31 22 **identification of these types of amphiboles, I'd have**
10:59:35 23 **to check.**
10:59:36 24 Q. Okay. So I was asking about the NIST
10:59:38 25 standard, and you threw in something else. I just

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10:57:26 1 professional geologist; he's probably analyzed
10:57:30 2 tens and tens and tens of thousands of samples.
10:57:33 3 He does compare to the appropriate
10:57:38 4 information --
10:57:43 5 MR. CIRSCH: Let him finish.
10:57:45 6 Q. (By Mr. Chachkes) Yeah.
10:57:46 7 **A. So did he pull out standard anthophyllite**
10:57:47 8 **tremolite? I would have to check.**
10:57:48 9 Q. So when you say compared to the
10:57:50 10 appropriate information, you have no knowledge of
10:57:52 11 what that appropriate information is, do you?
10:57:54 12 **A. Sure I do.**
10:57:54 13 MR. CIRSCH: Object to form.
10:57:56 14 THE WITNESS: The refractive indices, the
10:58:01 15 measurement of -- indices, the angle of
10:58:02 16 extinction, either oblique or parallel, depend
10:58:05 17 on cross polars, the dispersion staining on the
10:58:08 18 colors using the Su charts to determine the
10:58:12 19 refractive indices, the sign of elongation, or
10:58:13 20 the speed.
10:58:13 21 Q. (By Mr. Chachkes) So all these --
10:58:14 22 **A. All the standard mineralogical information**
10:58:16 23 **that a well-seasoned PLM analyst would do.**
10:58:20 24 Q. So I'm not talking about the data that he
10:58:23 25 pulls from looking at samples. I'm talking about

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10:59:41 1 want to focus on the NIST standard.
10:59:43 2 Sitting here today you're not aware that
10:59:44 3 your PLM scientist compared his results on the PLM
10:59:47 4 for the samples in this case directly to the NIST
10:59:52 5 sample -- NIST standards; correct?
10:59:55 6 MR. CIRSCH: Object to form.
10:59:56 7 THE WITNESS: It's not being aware or not
10:59:57 8 aware. It's just a question that I can clear up
11:00:01 9 and ask.
11:00:02 10 Q. (By Mr. Chachkes) Okay. Did you ask him
11:00:05 11 at any point?
11:00:07 12 **A. No. I typically don't ask 30-year**
11:00:12 13 **seasoned analysts/geologists on any particular**
11:00:15 14 **project. But now that you've asked the question,**
11:00:18 15 **I'll ask.**
11:00:18 16 Q. Okay. And so you have one analyst doing
11:00:24 17 all your PLM work for the MDL samples?
11:00:25 18 **A. Yes.**
11:00:26 19 Q. What's his name or her name?
11:00:27 20 A. **Paul Hess.**
11:00:29 21 Q. Spell the last name, please.
11:00:31 22 A. **H-e-s-s.**
11:00:32 23 Q. Your report doesn't state that there were
11:00:36 24 asbestos reference samples used in the PLM analysis;
25 correct?

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11:00:43 1 A. No, sir. It's not the type of information
 11:00:45 2 I would typically put in a report.
 11:00:47 3 Q. Do you know which set of NIST standards
 11:00:53 4 exist at MAS right now?
 11:00:56 5 A. It is the 1875, I think it is. I have to
 11:01:02 6 check the numbers on it. It's the standard NIST
 11:01:05 7 samples that all asbestos labs have or should have.
 11:01:09 8 Q. Do you know when you obtained them?
 11:01:11 9 A. Not as I sit here today.
 11:01:13 10 Q. Did your analyst compare any of the
 11:01:15 11 particles identified in this report by TEM with any
 11:01:19 12 known asbestos reference samples?
 11:01:21 13 A. Well, we have analyzed both reference
 11:01:30 14 tremolite series, anthophyllite series. We have all
 11:01:33 15 those reference standards, analytical data on the TEM
 11:01:39 16 walls. I don't think they pulled the reference and
 11:01:43 17 put them in each and every time, but they routinely
 11:01:47 18 check reference samples.
 11:01:49 19 Q. Okay. So when you say they check
 11:01:51 20 reference samples, are you saying you mean that they
 11:01:53 21 check to whatever's on your reference wall?
 11:01:56 22 MR. CIRSCH: Object to form.
 11:01:57 23 THE WITNESS: Well, no. The reference
 11:01:58 24 wall is from the reference samples, and we have
 11:02:01 25 analyzed reference samples in the past

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11:02:03 1 specifically for these J&J cases. And the
 11:02:08 2 analysts are well trained.
 11:02:10 3 I don't know how often they need to pull
 11:02:12 4 out a reference sample in order to identify
 11:02:14 5 either the anthophyllite solid solution series
 11:02:17 6 or the tremolite solid solution series.
 11:02:21 7 Q. (By Mr. Chachkes) Let's ask two different
 11:02:23 8 lines of questions here.
 11:02:24 9 So you have internal MAS-generated
 11:02:27 10 reference samples for TEM to identify asbestos; is
 11:02:30 11 that correct?
 11:02:30 12 A. Yes.

11:02:31 13 Q. Okay. Did you produce them?
 11:02:34 14 MR. CIRSCH: Object to form.
 11:02:35 15 THE WITNESS: I didn't think it was asked.
 11:02:37 16 MR. CHACHKES: Okay. I would ask the
 11:02:38 17 plaintiffs produce that, please.
 11:02:40 18 Q. (By Mr. Chachkes) What about reference
 11:02:42 19 samples generated by third parties, do you have
 11:02:47 20 those?
 11:02:49 21 A. Reference samples by third parties, you
 11:02:51 22 will have to -- NIST is a third party.
 11:02:53 23 Q. Okay. So anything else?
 11:02:58 24 A. We have accumulated reference samples now
 11:03:01 25 from anthophyllite asbestos from Windsor County, and

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11:03:09 1 I'd have to look at them and see what the validation
 11:03:13 2 is. We have cummingtonite standards now. We have
 11:03:17 3 grunerite standards. We have -- I believe we have
 11:03:21 4 winchite and richterite standards. We have not
 11:03:25 5 analyzed them yet to the degree where we can put the
 11:03:28 6 results altogether.
 11:03:28 7 Q. So are these -- so I'm talking about
 11:03:31 8 reference standards that you can look at those and
 11:03:35 9 compare to what you're generating in this case. So
 11:03:39 10 you're saying that there are third-party
 11:03:41 11 anthophyllite standards that you have that were
 11:03:45 12 produced by something in Windsor County?
 11:03:48 13 MR. CIRSCH: Object to form.
 11:03:49 14 THE WITNESS: It wasn't produced by
 11:03:50 15 Windsor County. It was a mineral house that
 11:03:57 16 sells them. And I have not had an opportunity
 11:04:01 17 to -- we haven't had an opportunity to look at
 11:04:03 18 them yet.
 11:04:03 19 Q. (By Mr. Chachkes) That's just the
 11:04:05 20 mineral, though, right, the raw mineral?
 11:04:07 21 MR. CIRSCH: Object to form.
 11:04:08 22 THE WITNESS: Well, it's fibrous, it's raw
 11:04:11 23 mineral anthophyllite, raw mineral
 11:04:15 24 cummingtonite, raw mineral grunerite, raw
 11:04:18 25 mineral winchite-richterite.

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11:04:22 1 Q. (By Mr. Chachkes) Okay. For those
 11:04:22 2 minerals that you just mentioned, did you obtain from
 11:04:24 3 a third party a TEM photo of the mineral at issue
 11:04:31 4 that you can use as a standard to compare what you
 11:04:34 5 find under your TEM?
 11:04:36 6 MR. CIRSCH: Object to form.
 11:04:38 7 THE WITNESS: No. Typically people don't
 11:04:39 8 provide that -- or NIST should have -- a TEM lab
 11:04:43 9 that's looking at standards should have the
 11:04:46 10 qualifications and training to be able to
 11:04:49 11 recognize the regulated asbestos types.
 11:04:52 12 Q. (By Mr. Chachkes) Okay. So, now, the
 11:04:54 13 only third-party TEM photographs that you could use
 11:04:59 14 as a standard for determining whether what you're
 11:05:03 15 looking at under your TEM is asbestos, the only one
 11:05:06 16 you've mentioned so far is NIST; correct?
 11:05:09 17 A. I'm sorry, I misunderstood.
 11:05:10 18 NIST does not provide you TEM pictures or
 11:05:12 19 EDS pictures or PLM pictures or any XRD pictures.
 11:05:16 20 They assume you have the training and capability of
 11:05:19 21 doing that.
 11:05:19 22 I'm not aware of any third-party group
 11:05:21 23 providing photograph standards along with the
 11:05:25 24 samples.
 11:05:25 25 Q. Okay. So to sum it all up, you do not

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11:05:27 1 have any third-party TEM photos that you use as
 11:05:33 2 standards to compare to what you're seeing under the
 11:05:35 3 TEM?
 11:05:36 4 MR. CIRSCH: Object to form.
 11:05:37 5 THE WITNESS: That's correct. No third
 11:05:38 6 party has sent us TEMs along with their
 11:05:41 7 standards and say here's a standard with a TEM
 11:05:44 8 photo and this is what it all looks like.

11:05:46 9 Q. (By Mr. Chachkes) Your report also does
 11:05:47 10 not state that the analyst used asbestos reference
 11:05:52 11 standards in their TEM analysis; correct?

11:05:55 12 A. **That is correct. None of our reports do.**

11:05:57 13 Q. How does your lab distribute samples to
 11:05:59 14 individual analysts to test? Is it random? Is it
 11:06:02 15 like some analysts get a certain kind of sample?

11:06:05 16 A. **It's random.**

11:06:06 17 Q. Is that the same for J3? Did you give
 11:06:08 18 them random samples?

11:06:11 19 MR. CIRSCH: Object to form.

11:06:13 20 THE WITNESS: Random samples. For J3 I
 11:06:15 21 specifically gave them the samples that we
 11:06:17 22 wanted XRD done on them.

11:06:18 23 Q. (By Mr. Chachkes) Okay. But for your
 11:06:23 24 individual analyst, nobody's getting like more
 11:06:25 25 Vermont and someone's getting more China, that kind

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11:06:29 1 of thing?
 11:06:29 2 A. **Not that I'm aware of.**
 11:06:30 3 Q. You didn't give any particular analyst
 11:06:32 4 like you're getting more bottles from the '50s and
 11:06:36 5 '60s and someone else is getting something more from
 11:06:38 6 a later era, that's not happening?
 11:06:40 7 A. **It's fairly random. The analysts don't**
 11:06:43 8 **have any knowledge of anything more than the sample**
 11:06:47 9 **number. They don't know if it's China or Vermont**
 11:06:51 10 **or -- we're not telling them anything other than they**
 11:06:54 11 **just get a sample number.**

11:06:55 12 Q. Who decides which analyst gets which
 11:06:58 13 bottles?

11:06:58 14 A. **That's a good question. I guess Victoria**
 11:07:08 15 **Panariello does.**

11:07:08 16 Q. Who is she?
 11:07:09 17 A. **She is the head person in our TEM lab.**

11:07:14 18 Q. Head person meaning administrative?
 11:07:18 19 Scientist?

11:07:18 20 A. **She's a scientist.**

11:07:19 21 Q. Does she do any analysis herself?

11:07:21 22 A. **Occasionally.**

11:07:22 23 Q. Under what instrument?

11:07:23 24 A. **She's -- she can do both polarized light**
 11:07:28 25 **microscopy as well as transmission electron**

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11:07:30 1 **microscopy.**

11:07:30 2 Q. Would you expect two analysts from your

11:07:34 3 laboratory, given splits from the same bottle, to

11:07:38 4 identify the same asbestos concentration?

11:07:40 5 A. **You'll never get an exact asbestos**

11:07:50 6 **concentration depending on what level of accessory**

11:07:57 7 **amphibole asbestos is in the sample, but I would not**

11:08:00 8 **expect the exact same.**

11:08:01 9 Q. What level of variation would you think is

11:08:05 10 so great that you would conclude something went

11:08:08 11 wrong?

11:08:10 12 A. **Don't know. I've not seen that variation**

11:08:12 13 **yet for two different samples of the same bottle**

11:08:15 14 **that's been analyzed.**

11:08:16 15 Q. Okay. Hypothetically, if you split a

11:08:19 16 bottle and one analyst found no detectable asbestos

11:08:22 17 and another found half a percent by concentration

11:08:27 18 asbestos, would you think that was within a

11:08:30 19 reasonable margin of error?

11:08:33 20 MR. CIRSCH: Object to form.

11:08:34 21 THE WITNESS: By TEM?

11:08:35 22 Q. (By Mr. Chachkes) Sure, by TEM.

11:08:37 23 A. **At a half a percent?**

11:08:39 24 Q. Yeah.

11:08:39 25 A. **No, that's not acceptable.**

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11:06:29 1 of thing?
 11:06:29 2 A. **Not that I'm aware of.**
 11:06:30 3 Q. You didn't give any particular analyst
 11:06:32 4 like you're getting more bottles from the '50s and
 11:06:36 5 '60s and someone else is getting something more from
 11:06:38 6 a later era, that's not happening?
 11:06:40 7 A. **It's fairly random. The analysts don't**
 11:06:43 8 **have any knowledge of anything more than the sample**
 11:06:47 9 **number. They don't know if it's China or Vermont**
 11:06:51 10 **or -- we're not telling them anything other than they**
 11:06:54 11 **just get a sample number.**

11:06:55 12 Q. Who decides which analyst gets which
 11:06:58 13 bottles?

11:06:58 14 A. **That's a good question. I guess Victoria**
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11:07:08 16 Q. Who is she?

11:07:09 17 A. **She is the head person in our TEM lab.**

11:07:14 18 Q. Head person meaning administrative?

11:07:18 19 Scientist?

11:07:18 20 A. **She's a scientist.**

11:07:19 21 Q. Does she do any analysis herself?

11:07:21 22 A. **Occasionally.**

11:07:22 23 Q. Under what instrument?

11:07:23 24 A. **She's -- she can do both polarized light**

11:07:28 25 **microscopy as well as transmission electron**

11:08:41 1 Q. Okay. What about one analyst finding no
 11:08:46 2 detectable asbestos, another finding a quarter of a
 11:08:50 3 percent?

11:08:50 4 MR. CIRSCH: Object to form.

11:08:51 5 Q. (By Mr. Chachkes) Is that an acceptable
 11:08:52 6 margin of error?

11:08:53 7 A. **.25 percent by weight? A quarter percent?**

11:08:59 8 Q. No, no. A quarter of a percent.

11:09:02 9 MR. CIRSCH: Object to form.

11:09:03 10 THE WITNESS: Isn't that .25? Isn't that
 11:09:05 11 a quarter of a percent?

11:09:09 12 Q. (By Mr. Chachkes) Yeah.

11:09:09 13 A. **Sometimes simple math gets the better of**
 11:09:13 14 me.

11:09:14 15 **I would think that would be unacceptable;**
 11:09:16 16 **something has gone wrong.**

11:09:18 17 Q. Just to spare me from the trouble of doing
 11:09:20 18 this all day, at what point would you say, you know,
 11:09:23 19 that's acceptable, and maybe a little larger wouldn't
 11:09:26 20 be acceptable?

11:09:26 21 MR. CIRSCH: Object to form.

11:09:27 22 THE WITNESS: I'd have to look at every
 11:09:29 23 situation to see what that percentage is before
 11:09:31 24 I could say what is acceptable and not
 11:09:34 25 acceptable.

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11:09:35 1 Q. (By Mr. Chachkes) Okay. You have no
11:09:39 2 written or decided standard in your laboratory for
11:09:42 3 what kind of error between two analysts is acceptable
11:09:45 4 or not acceptable, do you?

11:09:47 5 MR. CIRSCH: Object to form.

11:09:48 6 THE WITNESS: Yeah, we do. We have
11:09:49 7 measured where they have gone in and analyzed
11:09:52 8 the same sample. See, when you were asking for
11:09:53 9 what's acceptable and not acceptable, it's not
11:09:56 10 so much on the analyst's side. It could be the
11:09:58 11 preparation side. It could be a number of
11:10:01 12 things.

11:10:02 13 So we have done error rates for the
11:10:06 14 analyst by TEM analysis where they go in and we
11:10:10 15 know that in these many grid openings there's
11:10:12 16 this many fibers, and then we can have them
11:10:15 17 analyze the same grid openings.

11:10:17 18 You're taking out the part about the
11:10:19 19 sample preparation, the filter preparation. So
11:10:22 20 you have to look at it individually. But for
11:10:24 21 error rates for the analyst, we have that.

11:10:27 22 Q. (By Mr. Chachkes) Okay. But just
11:10:29 23 comparing -- just visually comparing a grid, a single
11:10:32 24 grid; correct?

11:10:33 25 MR. CIRSCH: Object to form.

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11:10:35 1 THE WITNESS: Grid openings --

11:10:35 2 Q. (By Mr. Chachkes) Yeah.

11:10:36 3 A. -- where each analyst is told to count the
11:10:39 4 same grid opening and, therefore, you can determine
11:10:43 5 what the analyst -- what the coefficient of variation
11:10:48 6 is.

11:10:49 7 If you have a sample where -- you take two
11:10:52 8 samples and one sample is -- they found one fiber in
11:10:54 9 a hundred grid openings and another sample they found
11:10:57 10 zero, that's within the -- that's within the margin
11:11:00 11 of error. That's acceptable.

11:11:02 12 If you have a sample where one analyst
11:11:04 13 found 50 fibers and one analyst found none or one,
11:11:10 14 then something has happened, and you have to go back
11:11:12 15 and look and go, okay, are the grid openings you
11:11:14 16 looked at he looked at in the first one. So there is
11:11:17 17 a process that we have to evaluate all data where we
11:11:22 18 have multiple samples of the same container.

11:11:24 19 Q. Sample preparation is extremely important
11:11:27 20 because that affects the --

21 (Cell phone rings.)

22 Q. (By Mr. Chachkes) Okay. Sample
23 preparation is extremely important because that
11:11:50 24 affects the outcomes; correct?

11:11:53 25 MR. CIRSCH: Object to form.

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11:11:54 1 THE WITNESS: All sample preparation is
11:11:55 2 important.

11:11:55 3 Q. (By Mr. Chachkes) And do all your
11:11:56 4 analysts use the same sample preparation methods?

11:12:01 5 A. All the people who -- the folks who
11:12:06 6 prepare the samples use the method that is
11:12:10 7 appropriate for the analysis that's going to be done.

11:12:13 8 Q. If there is -- for all the samples that
11:12:18 9 were analyzed in your report, were they prepared --
11:12:22 10 the sample preparation, were they all done by the
11:12:25 11 same method?

11:12:26 12 A. Yes.

11:12:26 13 Q. Were they all done by the same person?

11:12:28 14 A. I would have to look. But yes. Most
11:12:31 15 likely these samples were all done by the same
11:12:34 16 person.

11:12:34 17 Q. Okay. If you took a split from a single
11:12:41 18 bottle and you had two analysts look at it, would you
11:12:44 19 expect them to identify the same kinds of asbestos,
11:12:47 20 assuming there was asbestos spotted?

11:12:49 21 MR. CIRSCH: Object to form.

11:12:52 22 THE WITNESS: Not necessarily, no.

11:12:53 23 Q. (By Mr. Chachkes) Okay. So one could say
11:12:54 24 I see tremolite and another could say I see
11:12:57 25 anthophyllite and you don't think that is -- that

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11:13:01 1 demonstrates a problem?

11:13:03 2 MR. CIRSCH: Object to form.

11:13:04 3 THE WITNESS: If the chemistry is right,
11:13:08 4 the -- and they have identified it correctly,
11:13:11 5 no. Many of these samples have two types of
11:13:16 6 asbestos in it.

11:13:16 7 Q. (By Mr. Chachkes) Okay. Is there any
11:13:22 8 situation where you think an analyst has identified
11:13:26 9 an asbestos that you believe maybe there's an error
11:13:30 10 there?

11:13:32 11 MR. CIRSCH: Object to form.

11:13:33 12 THE WITNESS: I haven't run across
11:13:34 13 anything like that, no.

11:13:35 14 Q. (By Mr. Chachkes) And if one -- if there
11:13:36 15 was a split and one analyst said I found -- let's say
11:13:39 16 there was a split three ways, and one of your
11:13:42 17 analysts said I found anthophyllite, another analyst
11:13:45 18 said I found tremolite, and a third analyst said I
11:13:49 19 found nothing detectable, you would not say maybe
11:13:52 20 there's a problem here?

11:13:53 21 MR. CIRSCH: Object to form.

11:13:54 22 THE WITNESS: Unless I could review the
11:13:55 23 data and -- you know, it's an interesting
11:13:56 24 hypothetical. I don't think we have run across
11:13:58 25 that interesting hypothetical.

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11:13:59 1 But I would have to review the data to see
 11:14:02 2 what they're analyzing, what the chemistry is,
 11:14:05 3 how did they identify, and how many asbestos
 11:14:09 4 fibers the two that found it versus the one that
 11:14:12 5 didn't. So it's --
 11:14:14 6 Q. (By Mr. Chachkes) Okay.
 11:14:14 7 A. -- you just can't say is this a problem,
 11:14:18 8 this -- maybe, maybe not.

11:14:20 9 Q. Okay. So there is a situation you would
 11:14:22 10 say there is not a problem where three analysts
 11:14:25 11 looking at the same bottle finding -- one found
 11:14:29 12 anthophyllite, one found tremolite, one found nothing
 11:14:31 13 detectable, there is a situation where that would not
 11:14:33 14 be a problem, you can imagine that?

11:14:35 15 MR. CIRSCH: Object to form.

11:14:35 16 THE WITNESS: I don't know if I can
 11:14:37 17 imagine any of this happening, but it's your
 11:14:40 18 hypothetical. Unless I can look at the data and
 11:14:44 19 understand what each of the analysts were
 11:14:46 20 counting, how many structures, what is the
 11:14:48 21 chemistry, what is the diffraction patterns, is
 11:14:51 22 it the two analysts found one and one found
 11:14:54 23 zero, is this -- you know, what is the mine this
 11:14:58 24 is coming from, how does our other data look --
 11:15:01 25 there's a lot involved there than just saying

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11:15:58 1 MR. CIRSCH: Object to form.
 11:16:00 2 THE WITNESS: I don't think it's
 11:16:01 3 subjectivity. I just think it's wherever the
 11:16:05 4 cosmetic talc source was in any particular mine,
 11:16:09 5 what's there. We have many samples that have
 11:16:12 6 both types of asbestos in it.

11:16:14 7 So you can't say, well, you found this and
 11:16:18 8 the other one found that, when the source, the
 11:16:21 9 accessory -- amphibole asbestos accessory
 11:16:23 10 mineral in these mines have both types.

11:16:26 11 Q. (By Mr. Chachkes) If one of your
 11:16:27 12 scientists looked at a J&J bottle of talc and found a
 11:16:32 13 particular concentration of a particular kind of
 11:16:36 14 asbestos, would you -- do you believe to within a
 11:16:42 15 scientific -- a degree of scientific -- reasonable
 11:16:45 16 scientific degree of certainty that a second
 11:16:50 17 scientist following proper procedures would find the
 11:16:52 18 same?

11:16:52 19 MR. CIRSCH: Object to form.

11:16:53 20 THE WITNESS: I think we already talked
 11:16:54 21 about this. I would never expect a second
 11:16:56 22 scientist or a second analyst going in with a
 11:16:59 23 separate prep sample finding the exact amount.
 11:17:00 24 And again, it depends on how many is there.

11:17:03 25 We did discuss this once. If it's one or

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11:15:03 1 off the cuff, oh, that's a problem or that's not
 11:15:05 2 a problem.
 11:15:06 3 Q. (By Mr. Chachkes) Okay. All right. I've
 11:15:08 4 asked you whether you can imagine a situation where
 11:15:11 5 that's not a problem. You have not provided that to
 11:15:13 6 me. This is -- I'll just ask it one more time. Can
 11:15:16 7 you provide that to me? I can imagine that's not a
 11:15:18 8 problem.

11:15:18 9 MR. CIRSCH: Object to form. I think he
 11:15:20 10 answered your question.

11:15:21 11 THE WITNESS: I can't give you any
 11:15:22 12 additional information about that because I
 11:15:25 13 don't -- as a scientist I just don't like to
 11:15:27 14 say, well, this is -- I can imagine a problem
 11:15:30 15 here, I can't imagine it's a problem, without
 11:15:32 16 looking at any data to see how many asbestos
 11:15:34 17 fibers each of the analysts counted, is it one,
 11:15:37 18 is it ten, is it five, what's the chemistry look
 11:15:40 19 like, the EDXA, the SAED. I would have to
 11:15:47 20 review it to see if it's a problem or not.

11:15:49 21 Q. (By Mr. Chachkes) Is there sufficient
 11:15:50 22 subjectivity in the system such that it could be
 11:15:52 23 correct that one analyst could find in a bottle
 11:15:55 24 tremolite and another analyst could find in the
 11:15:57 25 bottle anthophyllite?

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11:17:05 1 two and the second analyst found none, that's in
 11:17:08 2 the margin of error, or it's looking for the
 11:17:12 3 needle in the haystack sort of analogy.

11:17:15 4 If one analyst found 50 and the other
 11:17:18 5 found zero, yes, that's a problem, like we
 11:17:19 6 already discussed. Again, I would have to look
 11:17:21 7 at the data to determine if it's a problem or
 11:17:23 8 not.

11:17:24 9 Q. (By Mr. Chachkes) Do you believe it's
 11:17:26 10 appropriate, given this margin of error, to run
 11:17:30 11 multiple tests on a single bottle and then average
 11:17:33 12 the results to get what would be the correct answer?

11:17:37 13 MR. CIRSCH: Object to form.

11:17:38 14 THE WITNESS: I don't think that's
 11:17:39 15 necessary. I think the -- we can accept what
 11:17:42 16 the analysis is. It comes from a sample in a
 11:17:45 17 bottle. The more you run, you may go from
 11:17:50 18 nondetect initially to detect in the second or
 11:17:54 19 third. But I don't think that is necessary to
 11:17:56 20 do for the types of analysis we're doing.

11:17:59 21 Q. (By Mr. Chachkes) For two of your
 11:18:02 22 analysts analyzing the same bottle, what degree of
 11:18:06 23 difference in the detected percentage of fibers
 11:18:10 24 versus detected percentage of bundles would you
 11:18:17 25 expect normally?

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11:18:19 1 MR. CIRSCH: Object to form.
 11:18:20 2 THE WITNESS: I don't have any
 11:18:21 3 expectations. The analyst is ultimately making
 11:18:24 4 the decision if it is a single fiber or a
 11:18:28 5 bundle. Because he's looking in the microscope,
 11:18:31 6 he's the one who can -- you're looking through
 11:18:34 7 the fiber, he's the one doing the -- he can
 11:18:38 8 change the focal plane, he can change from dark
 11:18:42 9 field to bright field, so ultimately he's making
 11:18:44 10 the decision on it.
 11:18:46 11 Q. (By Mr. Chachkes) I am asking really what
 11:18:49 12 is the margin of error in detecting fiber versus
 11:18:53 13 bundle percentage, acceptable margin of error. Have
 11:18:57 14 you ever figured that out?
 11:18:58 15 A. We haven't done that; it's really not
 11:19:00 16 necessary. It's more important for coefficients of
 11:19:04 17 variation. I've reviewed all the photographs of
 11:19:07 18 fibers and bundles. I would say 95, 98 percent of
 11:19:14 19 them I agree with. There's a couple percent in there
 11:19:18 20 that you have to leave it up to the analyst to make
 11:19:21 21 that decision.
 11:19:22 22 Q. Would you expect an analyst in your lab
 11:19:25 23 and an analyst in Lee Poye's lab to get the same
 11:19:29 24 results for a particular bottle? Is it the same
 11:19:32 25 answer as I've been getting with two analysts in your
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11:20:48 1 synonymously in your report?
 11:20:50 2 A. I think all ours say EDXA. EDS is old
 11:20:54 3 school. They're both the same technique: energy
 11:20:56 4 dispersive spectroscopy or energy dispersive x-ray
 11:21:00 5 spectroscopy.
 11:21:00 6 Q. Do you expect all the samples from a
 11:21:01 7 single mine, for example, the cosmetic talc from
 11:21:08 8 J&J's Vermont mine, to have similar SAED patterns?
 11:21:15 9 A. Depending on the orientation of the
 11:21:18 10 crystal and depending on what the material is.
 11:21:22 11 Tremolite, winchite, richterite,
 11:21:27 12 actinolite typically have similar, but the
 11:21:30 13 anthophyllite solid solution series, especially from
 11:21:34 14 Vermont where you can have no iron, iron-rich,
 11:21:38 15 cummingtonite, high-iron cummingtonite, and actually
 11:21:43 16 going to grunerite, those will have different
 11:21:46 17 reflections because you're going from orthorhombic to
 11:21:49 18 monoclinic.
 11:21:50 19 Q. So would you expect all the samples from a
 11:21:53 20 single mine to have the same concentration of
 11:21:57 21 asbestos?
 11:21:58 22 A. No.
 11:21:59 23 Q. Why not?
 11:22:00 24 A. Because you're dealing with accessory
 11:22:02 25 minerals. It just depends on where it's being dug
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11:19:34 1 lab?
 11:19:34 2 MR. CIRSCH: Object to form.
 11:19:36 3 THE WITNESS: Yes. I would expect,
 11:19:38 4 depending on what the count is or how many
 11:19:41 5 fibers, if it's not in the margin of error, that
 11:19:44 6 we would verify that it's same bottle as
 11:19:47 7 positive. But other than that, I would have to
 11:19:51 8 see the data to see.
 11:19:52 9 Q. (By Mr. Chachkes) When you say -- when
 11:19:55 10 you say it's not within the margin of error, what's
 11:19:58 11 the quantification of that margin of error?
 11:20:00 12 A. I think our analysts have a margin of
 11:20:02 13 error on coefficient of variation somewhere in the 6
 11:20:03 14 to 7 percent range. So one lab finding one fiber or
 11:20:07 15 maybe two fibers, another lab finding zero or finding
 11:20:10 16 four, I don't have any issue with that.
 11:20:14 17 Q. Would you expect the samples, the various
 11:20:23 18 bottles from a single mine, like all the bottles from
 11:20:26 19 J&J talc from Vermont, cosmetic talc from the Vermont
 11:20:31 20 mine, to have roughly the same EDS spectra?
 11:20:36 21 MR. CIRSCH: Object to form.
 11:20:38 22 THE WITNESS: Depending on the type of
 11:20:39 23 asbestos, yes.
 11:20:39 24 Q. (By Mr. Chachkes) Okay. By the way, I've
 11:20:43 25 seen EDXA; I've seen EDS. Do you use those
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11:22:07 1 out of the mine.
 11:22:07 2 Q. Would you expect all the samples from a
 11:22:10 3 single mine to have the same fiber versus bundle
 11:22:14 4 ratio?
 11:22:15 5 A. Not necessarily. All these materials are
 11:22:18 6 milled, and you're dealing with an asbestos type
 11:22:21 7 tremolite-anthophyllite that's brittle. So I don't
 11:22:26 8 know if I would expect to see the same bundles to
 11:22:30 9 fibers.
 11:22:30 10 And of course you're also dealing with the
 11:22:33 11 microscopist who has to make that final decision, the
 11:22:36 12 TEM microscopist, if it's a single fiber or bundle.
 11:22:40 13 What we try to make sure happens is that
 11:22:44 14 every asbestos fiber or bundle we identify meets the
 11:22:49 15 counting criteria for a regulated asbestos fiber or
 11:22:53 16 bundle as per the TEM methods, both ISO, ASTM.
 11:22:59 17 That's the most important thing.
 11:23:01 18 And then we try to also get some
 11:23:03 19 consistency on whether it's bundles or fibers. But
 11:23:08 20 that's what we strive for, is following the protocol,
 11:23:12 21 following the standard counting rules, and
 11:23:15 22 identification.
 11:23:16 23 Q. Hypothetically, if one of your researchers
 11:23:21 24 analyzed 150 different samples from a single mine and
 11:23:25 25 another researcher analyzed those same 150 samples,
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11:23:29 1 would you expect the averages for both the
 11:23:31 2 researchers to be the same?
 11:23:33 3 MR. CIRSCH: Object to form.
 11:23:34 4 THE WITNESS: I don't know. I'd have
 11:23:35 5 to -- I mean, again, you have to look at the
 11:23:37 6 data and determine what that percentage is for
 11:23:41 7 those exact same samples and what they found
 11:23:43 8 versus the other.
 11:23:45 9 I wouldn't be surprised if they're in the
 11:23:47 10 range of an average or in the range of high to
 11:23:49 11 low. If it's not in that range, then I would
 11:23:52 12 have to look at it to see if it's a problem or
 11:23:54 13 not.
 11:24:03 14 Can we go off the record for a second?
 11:24:07 15 MR. CIRSCH: Sure.
 11:24:11 16 (Recess from 11:24 a.m. to 11:39 a.m.)
 11:39:52 17 Q. (By Mr. Chachkes) Dr. Longo, there are
 11:40:50 18 bottles of J&J talc, cosmetic talc, where you've not
 11:40:56 19 detected asbestos; correct?
 11:40:58 20 A. That's correct.
 11:40:58 21 Q. So for example, there are some bottles of
 11:41:02 22 Vermont sourced J&J talc where you've not detected
 11:41:06 23 asbestos; correct?
 11:41:07 24 A. That is correct. The better way to say
 11:41:09 25 that is the asbestos, if present, is below our

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11:41:12 1 **detection limit.**
 11:41:13 2 Q. Okay. Do you have any opinion as to
 11:41:21 3 whether, if one of those bottles were retested,
 11:41:23 4 whether you would get the same result?
 11:41:25 5 MR. CIRSCH: Object to form.
 11:41:27 6 THE WITNESS: And again, this is -- the
 11:41:29 7 same result is either zero or nondetect below
 11:41:33 8 our detection limit or possibly one right at the
 11:41:36 9 detection limit, and I think we've had samples
 11:41:38 10 like that before.
 11:41:40 11 I think I can think of either Krystal
 11:41:45 12 Kim's two samples and Joanne Anderson's two
 11:41:50 13 samples, I believe one was positive and one was
 11:41:53 14 negative, but they were two different bottles.
 11:41:57 15 Where we have tested the two samples from
 11:42:01 16 the same bottle would be the 1978 historical,
 11:42:05 17 and we found them in both.
 11:42:07 18 Q. (By Mr. Chachkes) Okay. I'm not asking
 11:42:08 19 about specific bottles. So listen to the question
 11:42:11 20 I'm asking.
 11:42:12 21 If you had a nondetect on a bottle of J&J
 11:42:16 22 cosmetic talc for asbestos, would you expect,
 11:42:21 23 generally speaking, that if you ran the same test
 11:42:23 24 again, you would get the same result, the non-deduct?
 11:42:28 25 MR. CIRSCH: Object to form.

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11:42:29 1 THE WITNESS: I don't have any
 11:42:30 2 expectations one way or the other, and I think
 11:42:32 3 we've gone over this. This is the hypothetical
 11:42:34 4 if we analyzed it again, are we going to find
 11:42:36 5 the same thing. It depends on, again, how many
 11:42:39 6 asbestos fibers or bundles were detected the
 11:42:41 7 first time.
 11:42:41 8 If we detect one or two the first time and
 11:42:44 9 do it again and it's zero, that's within the
 11:42:46 10 error rate that you would expect. Or if we
 11:42:49 11 tested again and we find that it's even more,
 11:42:53 12 say three fibers or four fibers.
 11:42:56 13 So you have to look at specifically on
 11:42:58 14 what the first test is, and we're assuming the
 11:43:02 15 first test now is a nondetect, below our
 11:43:05 16 detection limit. And if the second test shows
 11:43:07 17 that there is one or two regulated asbestos
 11:43:10 18 fibers, that wouldn't surprise me.
 11:43:12 19 Q. (By Mr. Chachkes) Okay. So let me ask
 11:43:15 20 the question again because you really answered a
 11:43:16 21 different question.
 11:43:17 22 The question is, if you had a bottle of
 11:43:19 23 J&J talc where you had a nondetect. I'm not asking
 11:43:23 24 what your experience is. I'm not asking about a
 11:43:25 25 specific bottle. I'm asking just generally speaking,

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11:43:29 1 would you expect to have another nondetect if you
 11:43:32 2 were to test it again -- nondetect in the first
 11:43:36 3 instance?
 11:43:37 4 MR. CIRSCH: Object to form.
 11:43:38 5 THE WITNESS: I don't have an expectation
 11:43:39 6 one way or the other. The results are what they
 11:43:41 7 are.
 11:43:41 8 Q. (By Mr. Chachkes) Can you make any
 11:43:42 9 assumptions about a bottle of J&J cosmetic talc from
 11:43:47 10 Vermont about the asbestos content without analyzing
 11:43:49 11 the bottle?
 11:43:50 12 A. I don't believe you can predict just how
 11:43:57 13 much asbestos is in any particular bottle without
 11:44:00 14 analyzing it.
 11:44:02 15 Q. What about the possibility that there's no
 11:44:05 16 asbestos, can you -- if you haven't analyzed a bottle
 11:44:10 17 of J&J talc sourced from Vermont, is it possible that
 11:44:15 18 there's no detectable asbestos?
 11:44:18 19 MR. CIRSCH: Object to form.
 11:44:19 20 THE WITNESS: Again, I don't have
 11:44:21 21 expectations one way or the other. It's either
 11:44:25 22 going to be above, at, or below our detection
 11:44:28 23 limit, depending on the amount of regulated
 11:44:30 24 asbestos that's in that bottle.
 11:44:31 25 Q. (By Mr. Chachkes) You're not assuming

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11:44:32 1 that a nondetect of a J&J bottle of cosmetic talc is
 11:44:38 2 an incorrect result; correct?
 11:44:40 3 **A. I'm sorry, could you repeat that?**
 11:44:41 4 **Q.** Yeah, I didn't do you a favor there, did
 11:44:44 5 I?
 11:44:47 6 You don't believe that a nondetect for
 11:44:49 7 asbestos on a J&J bottle of cosmetic talc means
 11:44:53 8 you've made an error?
 11:44:55 9 MR. CIRSCH: Object to form.
 11:44:56 10 THE WITNESS: No. It only means that if
 11:44:59 11 there is regulated asbestos present in that
 11:45:01 12 bottle, it's below our analytical detection
 11:45:06 13 limit.
 11:45:07 14 **Q.** (By Mr. Chachkes) Your report includes
 11:45:10 15 EDXA spectra for several particles; correct?
 11:45:13 16 **A. For --**
 11:45:14 17 MR. CIRSCH: Object to form.
 11:45:15 18 THE WITNESS: For several regulated
 11:45:17 19 asbestos fibers and bundles, yes.
 11:45:19 20 **Q.** (By Mr. Chachkes) Describe how your
 11:45:20 21 analysts calibrate your EDXA system.
 11:45:22 22 **A. It's calibrated in the QA/QC, I believe,**
 11:45:23 23 **every couple of months where a standard is run and**
 11:45:30 24 **then they make a determination on its count rates.**
 11:45:34 25 **So whatever we have to do for the National Voluntary**

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11:47:05 1 **but we'll have to check it just to determine the**
 11:47:08 2 **sodium concentrations versus the potassium**
 11:47:12 3 **concentrations.**
 11:47:13 4 Q. Okay. So sitting here today, you don't
 11:47:14 5 know whether your analysts compare their EDXA spectra
 11:47:17 6 to third-party standards?
 11:47:19 7 **A. No, I didn't say that.**
 11:47:20 8 MR. CIRSCH: Object to form.
 11:47:21 9 THE WITNESS: We have our own standards,
 11:47:23 10 we have the NIST standards. And quite frankly,
 11:47:25 11 a TEM analyst identifying tremolite and
 11:47:28 12 anthophyllite or iron-rich anthophyllite is
 11:47:33 13 almost elementary compared to for people with
 11:47:37 14 analysts with a lot of experience. We have the
 11:47:40 15 references.
 11:47:43 16 If you have any particular issue with any
 11:47:45 17 particular EDXA spectra that you think has been
 11:47:50 18 misidentified as one of the regulatory asbestos
 11:47:52 19 types in these reports, I would be happy to look
 11:47:54 20 at it and we can discuss it.
 11:47:56 21 **Q.** (By Mr. Chachkes) I would like you to
 11:47:57 22 listen carefully to the question.
 11:47:58 23 The question is: For the EDXA spectra in
 11:48:04 24 your report, the conclusions made about which mineral
 11:48:06 25 that is based on the EDX -- which crystal that is

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11:45:42 1 **Laboratory Accreditation Program.**
 11:45:42 2 **Q.** Do you keep that data and results on your
 11:45:46 3 QA/QC?
 11:45:47 4 **A. Yes.**
 11:45:48 5 **Q.** Have you ever produced it?
 11:45:49 6 **A. No.**
 11:45:52 7 **Q.** How often do they calibrate -- strike
 11:45:57 8 that.
 11:45:57 9 Do your analysts compare their EDXA
 11:46:04 10 spectra to known reference samples, known reference
 11:46:11 11 spectra?
 11:46:11 12 **A. Yes.**
 11:46:12 13 **Q.** And are those spectra from outside MAS or
 11:46:16 14 generated within MAS?
 11:46:19 15 MR. CIRSCH: Object to form.
 11:46:21 16 THE WITNESS: The reference spectra have
 11:46:24 17 been generated by MAS.
 11:46:25 18 **Q.** (By Mr. Chachkes) And do your analysts
 11:46:27 19 compare their EDXA spectra to any third-party
 11:46:34 20 reference spectra?
 11:46:42 21 **A. Possibly. I mean, there's plenty of**
 11:46:47 22 **publications or book chapters in the past on things**
 11:46:51 23 **like tremolite, richterite, winchite. Not so much on**
 11:46:58 24 **richterite and winchite because it's a mineral that**
 11:47:03 25 **nobody seems to have. We believe we have some now,**

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11:48:10 1 based on the EDXA spectra, was that done comparing
 11:48:14 2 the spectra to a third-party standard?
 11:48:16 3 MR. CIRSCH: Object to form.
 11:48:17 4 THE WITNESS: Are you asking a third-party
 11:48:19 5 standard spectra or a third-party standard
 11:48:23 6 mineral like NIST?
 11:48:26 7 **Q.** (By Mr. Chachkes) Okay. How about a
 11:48:29 8 third-party standard, any third-party standard,
 11:48:32 9 somebody else other than your lab generated this
 11:48:34 10 spectra, you used that as a standard?
 11:48:36 11 **A. I don't know if we've looked at any other**
 11:48:39 12 **third-party spectra other than what has been -- I**
 11:48:45 13 **think Jim Millette has published in the past. I know**
 11:48:48 14 **we have his stuff. I believe McCrone has also. I**
 11:48:53 15 **have to look in the particle analysis if they've done**
 11:48:56 16 **that. But typically we rely on the actual minerals**
 11:48:59 17 **and the spectra that we've generated in the past**
 11:49:01 18 **from the standards.**
 11:49:02 19 **Q.** So the question isn't about whether
 11:49:04 20 **third-party standards exist. I'm talking about the**
 11:49:07 21 **functional day-to-day your analysts doing an EDXA**
 11:49:11 22 **spectra. Sitting there, does he look over at some**
 11:49:15 23 **third-party document, or does he look at an MAS**
 11:49:19 24 **internal document to determine this is what I'm**
 11:49:21 25 **looking at?**

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11:49:22 1 MR. CIRSCH: Object to form.
 11:49:23 2 THE WITNESS: I doubt he's looking at when
 11:49:25 3 he takes a spectra of either tremolite series or
 11:49:28 4 anthophyllite series that he's turning over and
 11:49:31 5 looking at a known reference. These analysts
 11:49:34 6 have been doing this for years and years and
 11:49:37 7 years.

11:49:37 8 We have references, but I can't imagine
 11:49:43 9 every time he takes an EDX spectra that looks
 11:49:47 10 the same time after time after time that he's
 11:49:49 11 looking at a third-party reference at that
 11:49:51 12 particular point in time.

11:49:52 13 Q. (By Mr. Chachkes) Okay. How many
 11:49:56 14 different analysts do you have doing EDXA spectra?

11:49:59 15 A. Four.

11:49:59 16 Q. Does NIST have an EDXA reference spectra
 11:50:06 17 for the various asbestos?

11:50:11 18 MR. CIRSCH: Object to form.

11:50:12 19 THE WITNESS: I think you already asked
 11:50:14 20 that. And besides not having a -- providing a
 11:50:16 21 TEM photo, they do not provide an actual
 11:50:22 22 spectra. But I think most -- I think there's a
 11:50:26 23 number of third-party references I believe just
 11:50:28 24 give you the ratios of what you would see in
 11:50:31 25 EDXA for the magnesium, the silicon, the

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11:50:37 1 calcium, potentially some iron, tremolite, or
 11:50:41 2 actinolite.
 11:50:43 3 Q. (By Mr. Chachkes) Why is EDXA useful?
 11:50:47 4 A. Provides the inorganic, and depending on
 11:50:52 5 your detector, organic chemistry of any particular
 11:50:56 6 elongated particulate.

11:50:58 7 Q. When you look at an EDXA spectra, do you
 11:51:03 8 assume it's a regulated particle and then look to
 11:51:07 9 which regulated particles have the metal-to-silicon
 11:51:11 10 ratio that correspond?

11:51:14 11 MR. CIRSCH: Object to form.

11:51:15 12 THE WITNESS: Well, we typically don't do
 11:51:18 13 an EDX spectra unless it meets the definition of
 11:51:22 14 a regulated -- it has the potential for a
 11:51:27 15 regulated asbestos fiber or bundle.

11:51:29 16 So it's got to be at least .5 micrometers
 11:51:33 17 in length or greater, it's got to have an equal
 11:51:36 18 to -- greater than or equal to 5-to-1 aspect
 11:51:41 19 ratio, and parallel sides. Then the analyst --
 11:51:46 20 first thing I would assume is do EDXA and check
 11:51:50 21 the chemistry. And then SAED.

11:51:55 22 Q. (By Mr. Chachkes) If your analyst sees
 11:51:58 23 something that's, what did you say, greater than .55
 11:52:04 24 millimeters?

11:52:05 25 A. Microns.

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1 Q. Microns, I'm sorry.

11:52:06 2 A. Micrometers.

11:52:06 3 Q. Okay. So strike that.

11:52:08 4 If your analyst sees something that's
 11:52:11 5 greater than .5 micrometers and has an aspect ratio
 11:52:14 6 of at least 5-to-1, then he might do EDXA?

11:52:18 7 A. If it has parallel sides, yes. And he may
 11:52:25 8 do SAED. It doesn't matter which one. But then he
 11:52:29 9 would have to go through the sequence of determining
 11:52:31 10 if it meets the definition for the regulated asbestos
 11:52:35 11 chemistry and the crystalline structure.

11:52:37 12 Q. Are there minerals that exist in the world
 11:52:40 13 other than regulated particles, regulated asbestos
 11:52:44 14 particles, that are greater than .5 micrometers and
 11:52:50 15 can have an aspect ratio of greater than 5-to-1?

11:52:53 16 MR. CIRSCH: Object to form.

11:52:54 17 Q. (By Mr. Chachkes) And with parallel
 11:52:56 18 sides?

11:52:56 19 A. Yes.

11:52:56 20 Q. Potentially dozens if not hundreds; right?

11:53:01 21 A. I haven't counted them all up. But what
 11:53:04 22 we potentially see is asbestiform talc bundles or
 11:53:08 23 fibers all the time. So, yeah, you have to
 11:53:12 24 distinguish between a talc fiber or bundle and an
 11:53:17 25 anthophyllite fiber or bundle.

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11:53:18 1 Q. The question really is about minerals, so
 11:53:20 2 let's focus on what I've just asked, which is: There
 11:53:25 3 are potentially dozens if not hundreds of minerals
 11:53:29 4 that can have parallel sides, that can have -- be
 11:53:34 5 bigger than .5 micrometers, and have aspect ratios
 11:53:37 6 that are 5-to-1 or greater?

11:53:39 7 MR. CIRSCH: Object to form.

11:53:40 8 THE WITNESS: And I apologize, but I just
 11:53:42 9 stated I haven't counted them up. And really,
 11:53:46 10 we're not interested in the hundreds or whatever
 11:53:47 11 it is around the world.

11:53:49 12 It's primarily what do we find in the talc
 11:53:55 13 deposits that are asbestiform or fibrous and
 11:54:00 14 meet those definitions. And typically the only
 11:54:04 15 thing we routinely see is fibrous talc. Every
 11:54:10 16 now and then an antigorite fiber may show up.

11:54:16 17 But I don't -- to answer your question you
 11:54:19 18 asked, I haven't counted how many are out there.

11:54:21 19 Q. (By Mr. Chachkes) Does MAS conduct
 11:54:24 20 qualitative EDS analysis or quantitative EDS
 11:54:27 21 analysis?

11:54:28 22 A. I believe every spectra in here is
 11:54:31 23 quantitative EDS analysis.

11:54:33 24 Q. So you actually calculate the peak sizes
 11:54:36 25 and do the math?

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11:54:37 1 A. We can, but we take the raw data, so that
 11:54:41 2 has to have at least 300 seconds of collection. But
 11:54:46 3 it's easy to do. You can actually calculate the
 11:54:51 4 concentration of the oxides under the peaks. We
 11:54:54 5 don't normally do that unless it's necessary.

11:54:58 6 Q. So when you -- just to summarize, when you
 11:55:07 7 do identification of mineral by EDXA, you are
 11:55:13 8 assuming that it's not any of the potentially dozens
 11:55:17 9 or hundreds of other minerals that aren't regulated;
 11:55:22 10 correct?

11:55:22 11 MR. CIRSCH: Object to form.

11:55:23 12 THE WITNESS: That's not what I said. I
 11:55:24 13 said I didn't know them all. But there's no
 11:55:27 14 minerals out there that has all the
 11:55:29 15 characteristics of a specific type of a
 11:55:32 16 regulated asbestos fiber, and that's why you go
 11:55:36 17 through the analytical process.

11:55:39 18 You can get other fibrous materials, but
 11:55:42 19 they'll have aluminum or the
 11:55:47 20 magnesium-to-silicon ratios are off. But you
 11:55:50 21 just don't see that many of these other than
 11:55:53 22 fibrous talc.

11:55:54 23 So of course we don't make an assumption
 11:55:56 24 what it is. That's why you do the chemistry and
 11:55:59 25 the selected area electron diffraction.

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11:56:04 1 Q. (By Mr. Chachkes) How many minerals have
 11:56:06 2 the same constituent elements as regulated asbestos?

11:56:13 3 MR. CIRSCH: Object to form.

11:56:14 4 THE WITNESS: Don't know.

11:56:14 5 Q. (By Mr. Chachkes) It could be hundreds?

11:56:16 6 MR. CIRSCH: Object to form.

11:56:17 7 THE WITNESS: It's not a matter if it has
 11:56:19 8 the same constituents --

11:56:21 9 Q. (By Mr. Chachkes) My question was --

11:56:22 10 MR. CIRSCH: Hold on. Let him answer the
 11:56:24 11 question, please.

11:56:25 12 THE WITNESS: I haven't -- again, I
 11:56:26 13 haven't tried to sit down and go through all the
 11:56:28 14 minerals in the world that may have magnesium,
 11:56:31 15 silicon, or magnesium, silicon, and calcium.
 11:56:37 16 What's important is the ratio to the standards
 11:56:40 17 to the chemistry to the selected area electron
 11:56:44 18 diffraction.

11:56:44 19 MR. CHACHKES: Okay. Let's mark as
 11:56:45 20 Exhibit 12.

21 (Defendants' Exhibit 12 was marked for
 11:56:58 22 identification.)

11:56:58 23 Q. (By Mr. Chachkes) This is an extracted
 11:57:00 24 page from page 132 of your report. Do you recognize
 11:57:05 25 this as one of your EDXA spectra?

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11:57:08 1 A. I do recognize it.

11:57:10 2 Q. Okay. Now, up at the top it says -- do
 11:57:13 3 you see where it says tremolite?

11:57:14 4 A. Yes.

11:57:14 5 Q. You typed that in, right, or your lab
 11:57:17 6 typed that in?

11:57:19 7 A. After they identified it, yes.

11:57:21 8 Q. Okay. What's the name of the software you
 11:57:28 9 use to generate this spectra?

11:57:31 10 A. You got me there. I don't know the name
 11:57:33 11 of the software. It's whatever the EDS system is on
 11:57:37 12 this particular one. It's not a light element
 11:57:39 13 detector. It comes with the EDXA system. I don't
 11:57:44 14 know what they call their software.

11:57:46 15 Q. Do you run the EDXA yourself?

11:57:49 16 A. Not anymore, no.

11:57:50 17 Q. Did you run any EDXA for any of the
 11:57:53 18 samples in the MDL?

11:58:00 19 A. No, sir.

11:58:00 20 Q. And walk me through how you determine the
 11:58:03 21 chemical composition of a -- what you're looking at
 11:58:07 22 from the spectra.

11:58:10 23 MR. CIRSCH: Object to form.

11:58:11 24 THE WITNESS: How far back do you want me
 11:58:14 25 to start?

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11:58:14 1 Q. (By Mr. Chachkes) Well, let me ask you
 11:58:15 2 this.

11:58:16 3 A. Electrons hit the solid -- electron beam
 11:58:20 4 hits the solid with enough energy to eject elements
 11:58:23 5 out of their orbital.

6 Q. We're not --

11:58:26 7 A. You don't want me to go back that far?

11:58:27 8 Q. No.

9 A. Okay.

11:58:27 10 Q. So you look at the areas of the peaks;
 11:58:30 11 right?

11:58:30 12 A. No, what we -- we look at the peak ratios,
 11:58:34 13 the areas -- you can't look at the areas, but the
 11:58:37 14 peak ratios is what's important here. This is a
 11:58:42 15 typical tremolite with a small amount of iron, so
 11:58:44 16 this would not be enough iron to get into the
 11:58:46 17 actinolite range. There's no potassium. I don't see
 11:58:52 18 much of a sodium peak, so I would call this just
 11:58:57 19 tremolite.

20 So the electron beam is put on a spot size
 11:59:01 21 onto the bundle or fiber, and the system essentially
 11:59:04 22 is turned on and starts collecting x-rays from the
 11:59:08 23 different energy levels that are consistent with the
 11:59:12 24 different elements.

25 Q. Okay. Let's just focus on you said you

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11:59:15 1 look at the ratios of the peaks; right?
 11:59:18 2 MR. CIRSCH: Object to form.
 11:59:19 3 Q. (By Mr. Chachkes) Am I misstating your
 11:59:21 4 testimony?

11:59:21 5 A. No. I guess I'm trying to understand what
 11:59:24 6 you're asking. Maybe you should repeat the question.

11:59:26 7 Q. Okay. You've got a -- I'm not asking how
 11:59:30 8 the machine works. I'm asking you how you take this
 11:59:33 9 result in Exhibit 12 and turn that into a conclusion.

11:59:38 10 So I'm asking do you look at the ratio of
 11:59:43 11 the peak heights -- is that one of the things you
 11:59:47 12 look at?

11:59:48 13 A. Yes.

11:59:48 14 Q. Okay. What's the ratio you look at
 11:59:49 15 specifically?

11:59:51 16 MR. CIRSCH: Object to form.

11:59:52 17 THE WITNESS: You have a magnesium and
 11:59:54 18 calcium peak that are pretty close. Typically
 11:59:57 19 the calcium peak can be a little lower.

11:59:59 20 If it's a light element detector, the
 12:00:01 21 magnesium can be a little higher, the silicon
 12:00:05 22 will be your primary peak, somewhere in the 25
 12:00:09 23 to 30 percent of the magnesium for a non-light
 12:00:10 24 element detector. And the calcium peaks and the
 12:00:15 25 magnesium peaks are usually very similar in

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12:01:28 1 give you a peak, but they'll write out what the
 12:01:31 2 ratio ranges are.

12:01:33 3 Q. (By Mr. Chachkes) Okay. And those ratios
 12:01:35 4 are -- are they simply the peak height, or do they
 12:01:37 5 take into account the peak area?

12:01:39 6 A. Well, the peak height and the peak area
 12:01:43 7 are consistent. I mean, the peak area is going to --
 12:01:50 8 the peak height is going to depend on the area,
 12:01:52 9 because as the area of the peak builds up, that's
 12:01:56 10 just more counts.

12:01:57 11 If you change the chemistry,
 12:01:59 12 hypothetically, of, say, tremolite, you have added
 12:02:03 13 more magnesium elements to it, you're going to have
 12:02:07 14 higher peaks, so they're interrelated.

12:02:10 15 Q. Do the standards that you're referring to
 12:02:12 16 refer to simply peak height or they refer to peak
 12:02:14 17 area?

12:02:14 18 MR. CIRSCH: Object to form.
 12:02:15 19 THE WITNESS: All the standards in the TEM
 12:02:17 20 protocols usually typically just give you
 12:02:20 21 ratios. So I don't -- and if you look in the
 12:02:24 22 identification, usually they will spell it out,
 12:02:27 23 like this is the ratio for tremolite, this is
 12:02:29 24 the ratio for chrysotile, and so on.

12:02:30 25 Q. (By Mr. Chachkes) My question is the
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12:00:17 1 size.
 12:00:17 2 And then we look at the amount of iron to
 12:00:20 3 see if we're going to call it actinolite versus
 12:00:23 4 tremolite. And not aware of any other minerals
 12:00:27 5 out there that have those ratios, so that's how
 12:00:34 6 I call it tremolite.

12:00:35 7 Q. (By Mr. Chachkes) When you say ratio,
 12:00:36 8 what are you doing? You're adding, what, the height
 12:00:38 9 of the metals to -- for the numerator and then on the
 12:00:43 10 denominator is the height of the silicon peak?

12:00:47 11 A. We're looking at the silicon peak versus
 12:00:49 12 the magnesium and the calcium peak, and we're looking
 12:00:53 13 at the magnesium and the calcium peak to determine
 12:00:56 14 if -- how much they line up together. It could be a
 12:01:00 15 little higher, it could be lower, but I would call it
 12:01:04 16 typical tremolite peak.

12:01:05 17 Q. And if I --

12:01:06 18 A. Tremolite chemistry.

12:01:08 19 Q. If I want to go to a third-party source

12:01:11 20 that confirms that this is the appropriate way to
 12:01:13 21 analyze EDXA data, what would you point me to?

12:01:16 22 MR. CIRSCH: Object to form.

12:01:17 23 THE WITNESS: I'd have to look through the
 12:01:21 24 protocols, but I believe they give you all the
 12:01:24 25 ratios and say the AHERA, the ISO. They don't

12:02:31 1 ratio of what? Is it ratio of just simply height, or
 12:02:35 2 is it ratio of peak area?

12:02:38 3 A. Peak area and peak height are
 12:02:40 4 interchangeable. It's not -- the peak area, if
 12:02:44 5 you're going to calculate the oxides -- the peak
 12:02:51 6 area -- it's not the peak area.

12:02:53 7 Let's make it simple. It's not the peak
 12:02:55 8 area. It's the peak height.

12:02:57 9 Q. Okay. And that's what the standards say,
 12:02:59 10 peak height?

12:03:00 11 MR. CIRSCH: Object to form.

12:03:01 12 THE WITNESS: I believe so.

12:03:01 13 Q. (By Mr. Chachkes) Okay. And one measures
 12:03:03 14 that simply -- you just take a ruler and place it
 12:03:06 15 vertically and you could get a peak height?

12:03:09 16 A. Yeah, you could, if you wanted to.

12:03:11 17 Q. Okay. Do you actually do that
 12:03:12 18 quantitatively with numbers, or do you just kind of
 12:03:15 19 eyeball it?

12:03:17 20 MR. CIRSCH: Object to form.

12:03:18 21 THE WITNESS: All the analysts would --
 12:03:21 22 could probably draw that. You know, it's years
 12:03:24 23 and years' experience. You don't have to take
 12:03:25 24 the ratios. And if you look at the standards,
 12:03:29 25 they will look pretty much identical to that.

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12:03:31 1 But again, you have to be careful if
12:03:33 2 you're looking at a windowless detector, which
12:03:38 3 is more sensitive for the different elements.
12:03:39 4 Q. (By Mr. Chachkes) My question is about
12:03:41 5 what your analysts actually do. Do they actually
12:03:43 6 quantify the heights and run the numbers, or are they
12:03:46 7 eyeballing it?

12:03:49 8 MR. CIRSCH: Object to form.

12:03:49 9 THE WITNESS: I think at this stage of
12:03:51 10 their careers they're just visually confirming
12:03:54 11 the proper elements and the proper ratios.

12:03:56 12 Q. (By Mr. Chachkes) And the software can
12:04:01 13 generate those numbers; right?

12:04:04 14 A. **The software generates the height? The
12:04:07 15 ratios?**

12:04:08 16 Q. Yes.

12:04:08 17 A. **I don't know.**

12:04:09 18 Q. So look at the bottom of Exhibit 12 in the
12:04:12 19 bottom left. Do you see how it says magnesium,
12:04:19 20 silicon, calcium, iron, down there on the bottom
12:04:23 21 left; do you see that?

12:04:23 22 A. **Yes.**

12:04:24 23 Q. You can print out some -- there's data
12:04:26 24 that goes there that the software can generate;
12:04:28 25 correct?

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12:05:10 1 MR. CIRSCH: Object to form.
12:05:11 2 THE WITNESS: No. It's just not -- that
12:05:14 3 data is just not something I'm relying on for my
12:05:16 4 opinions in this case.

12:05:17 5 Q. (By Mr. Chachkes) And that data being the
12:05:19 6 specific numerical representation of the peak
12:05:23 7 heights?

12:05:23 8 MR. CIRSCH: Object to form.

12:05:24 9 THE WITNESS: I believe what that gives
12:05:25 10 you is the percentage of one element to the
12:05:27 11 other, not peak heights.

12:05:29 12 Q. (By Mr. Chachkes) You're sure of that?
12:05:31 13 MR. CIRSCH: Object to form.

12:05:32 14 THE WITNESS: Pretty sure.

12:05:33 15 Q. (By Mr. Chachkes) Okay. But anyway, you
12:05:37 16 didn't produce that data in your report, did you?

12:05:39 17 MR. CIRSCH: Object to form.

12:05:39 18 THE WITNESS: No, sir. It's not something
12:05:41 19 that's required to render my opinions in this
12:05:43 20 case --

12:05:44 21 Q. (By Mr. Chachkes) Okay.

12:05:45 22 A. **-- in this MDL.**

12:05:56 23 MR. CHACHKES: Let's just mark this as
12:05:57 24 Exhibit 13.

12:05:58 25 (Defendants' Exhibit 13 was marked for

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12:04:29 1 A. **That's correct.**

12:04:29 2 Q. Why don't you generate it? Why don't you
12:04:31 3 generate it?

12:04:32 4 MR. CIRSCH: Object to form.

12:04:33 5 THE WITNESS: There's no need to. It's
12:04:35 6 not required for this type of analysis to
12:04:38 7 identify tremolite.

12:04:39 8 Q. (By Mr. Chachkes) Do you have that data
12:04:41 9 somewhere still saved in a machine somewhere?

12:04:44 10 A. **That, I don't know.**

12:04:45 11 Q. Okay. We are going to request that to be
12:04:48 12 produced. I know your machine generates it. So if
12:04:51 13 you could see whether you could produce that, we'd
12:04:54 14 appreciate it.

12:04:55 15 MS. O'DELL: We'll consider your request.

12:04:58 16 We're making no commitment we're going to do
12:05:00 17 that.

12:05:00 18 MR. CHACHKES: Okay.

12:05:00 19 Q. (By Mr. Chachkes) You don't deliberately
12:05:01 20 delete that data, do you?

12:05:03 21 MR. CIRSCH: Object to form.

12:05:04 22 THE WITNESS: No, sir, I have not
12:05:05 23 deliberately deleted that data.

12:05:07 24 Q. (By Mr. Chachkes) You don't instruct your
12:05:08 25 researchers to delete that data, do you?

12:06:15 1 identification.)

12:06:16 2 Q. (By Mr. Chachkes) All right. Look on the
12:06:19 3 last page of Exhibit 13. There appears to be an EDXA
12:06:23 4 spectra; do you see that?

12:06:24 5 A. **I do.**

12:06:25 6 Q. And it appears to be generated by the same
12:06:29 7 software as you're using. All the fonts are the
12:06:31 8 same; everything appears to be the same. Do you have
12:06:34 9 any opinion on that?

12:06:34 10 MR. CIRSCH: Object to form.

12:06:35 11 THE WITNESS: No.

12:06:35 12 Q. (By Mr. Chachkes) All that information on
12:06:38 13 the lower left-hand corner in the Exhibit 13, you
12:06:42 14 could generate that information; right?

12:06:44 15 MR. CIRSCH: Object to form.

12:06:45 16 THE WITNESS: I don't know if we have the
12:06:47 17 same software, same software upgrades, so I
12:06:50 18 can't comment on that.

12:06:51 19 Q. (By Mr. Chachkes) Can you generate that
12:06:52 20 information that's down there in the lower left-hand
12:06:55 21 corner --

12:06:55 22 MR. CIRSCH: Object to form.

12:06:56 23 Q. (By Mr. Chachkes) -- on Exhibit 13, last
12:06:57 24 page?

12:06:57 25 A. **And I don't mean to be disrespectful, but**

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12:07:00 1 **I don't know. I don't know if we have the same**
 12:07:02 2 **updated software, et cetera, so I can't say one way**
 12:07:05 3 **or the other.**

12:07:05 4 Q. Do you know whether the data you have from
 12:07:13 5 your EDXA runs allows you to calculate numerical
 12:07:20 6 values for the weight percentage of the elements?

12:07:23 7 **A. I believe I've just already stated I'm**
 12:07:27 8 **not -- I don't know what software system we have and**
 12:07:31 9 **can it do that or not.**

12:07:32 10 Q. Okay. And same question, so whether you
 12:07:35 11 can generate the standard definitions or atomic
 12:07:39 12 percentages or all those other ones, you just don't
 12:07:43 13 know one way or the other whether you can calculate
 12:07:46 14 those numbers using your EDXA apparatus?

12:07:50 15 MR. CIRSCH: Object to form.

12:07:51 16 THE WITNESS: It may be possible and we
 12:07:52 17 may be able to. I just don't know until I ask.

12:08:01 18 Q. (By Mr. Chachkes) Do you know of any
 12:08:06 19 third-party published source that approves of
 12:08:11 20 eyeballing EDXA spectra to determine what the
 12:08:14 21 composition of the material you're looking at?

12:08:17 22 MR. CIRSCH: Object to form.

12:08:17 23 THE WITNESS: Yes.

12:08:18 24 Q. (By Mr. Chachkes) What?

12:08:18 25 **A. All the assessors that ever walked in our**

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12:08:25 1 **lab with the National Voluntary Laboratory**
 12:08:26 2 **Accreditation Program do not require anybody to**
 12:08:28 3 **measure peak heights and look at ratios for tremolite**
 12:08:32 4 **or any of these.**

12:08:35 5 **You may want to make a green analyst who**
 12:08:38 6 **hasn't been doing this for a while do that if he has**
 12:08:41 7 **some issues, but it's not something that I've ever**
 12:08:44 8 **seen the auditors say that is necessary.**

12:08:46 9 Q. Is there any --

12:08:47 10 MR. CIRSCH: Did you finish your answer?

12:08:49 11 THE WITNESS: Yes.

12:08:49 12 Q. (By Mr. Chachkes) Is there any

12:08:50 13 peer-reviewed literature that approves of eyeballing

12:08:54 14 EDXA patterns to determine the chemical composition

12:08:57 15 you're looking at?

12:08:58 16 MR. CIRSCH: Object to form.

12:08:59 17 Q. (By Mr. Chachkes) Peer-reviewed

12:09:00 18 literature.

12:09:00 19 **A. I don't know of any peer-reviewed**
 12:09:02 20 **literature that says that comparing the spectras or**
 12:09:07 21 **looking at the spectras and comparing them should not**
 12:09:10 22 **be done, that you have to use a ruler for every one**
 12:09:13 23 **of them. I'm not aware of any literature that states**
 12:09:15 24 **that, peer-reviewed literature.**

12:09:16 25 Q. Not my question. Any peer-reviewed

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12:09:19 1 literature that says eyeballing it is okay?
 12:09:22 2 MR. CIRSCH: Object to form.
 12:09:23 3 THE WITNESS: I wouldn't put it eyeballing
 12:09:26 4 comparing to the standards and looking at the
 12:09:28 5 ratios.
 12:09:29 6 I'm not aware of any peer-reviewed
 12:09:32 7 literature that makes that affirmative or
 12:09:34 8 negative statement one way or the other.
 12:09:36 9 Q. (By Mr. Chachkes) But you are aware of
 12:09:37 10 peer-reviewed literature that uses actual
 12:09:39 11 quantitative numbers and calculates the kind of
 12:09:43 12 information we see in Exhibit 13 which is like weight
 12:09:47 13 percentages; you're aware of that; right?
 12:09:48 14 MR. CIRSCH: Object to form.
 12:09:50 15 THE WITNESS: For this type of analysis
 12:09:52 16 where you're just confirming, I'm not aware of
 12:09:56 17 any. Maybe there is. Show some if you have
 12:10:01 18 one.
 12:10:01 19 Q. (By Mr. Chachkes) So when you say just
 12:10:03 20 confirming, you're not using EDXA to determine in a
 12:10:08 21 vacuum what I'm looking at. You've already made some
 12:10:10 22 assumptions about what you may be looking at?
 12:10:12 23 **A. No, we never make assumptions. We do the**
 12:10:15 24 **chemistry, and the chemistry is unique. If you go**
 12:10:18 25 **through here -- I was just looking at some. You**

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12:10:19 1 **know, hornblende. Well, there's no aluminum in**
 12:10:23 2 **tremolite. It's fairly straightforward.**
 12:10:26 3 Q. Okay. You don't redact the information
 12:10:38 4 that's in the lower left-hand corner of what's been
 12:10:41 5 marked as Exhibit 12; right?
 12:10:44 6 A. No.
 12:10:44 7 MR. CIRSCH: Object to form.
 12:10:45 8 Q. (By Mr. Chachkes) And you've never
 12:10:46 9 redacted that information, have you?
 12:10:48 10 MR. CIRSCH: Object to form.
 12:10:49 11 THE WITNESS: No.
 12:10:49 12 Q. (By Mr. Chachkes) Were they trained not
 12:10:56 13 to fill in the lower left-hand corner, your analysts?
 12:11:00 14 MR. CIRSCH: Object to form.
 12:11:01 15 THE WITNESS: They weren't trained one way
 12:11:02 16 or the other. It's not required for our
 12:11:04 17 certifications. NVLAP does not require you to
 12:11:09 18 run weight percentages, oxides, or any of that.
 12:11:11 19 You have to demonstrate your ability to identify
 12:11:16 20 regulated asbestos.
 12:11:19 21 We've never had it be suggested that we
 12:11:22 22 are misidentifying tremolite in any
 12:11:26 23 circumstance.
 12:11:27 24 Q. (By Mr. Chachkes) All right. So the
 12:11:38 25 first step in analyzing an EDXA, though, is to

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12:11:41 1 determine the ratio of the metals to silicon; right?
 12:11:45 2 A. **The first step?**
 12:11:46 3 Q. Yeah.
 12:11:47 4 A. **The first step -- the first step is to**
 12:11:50 5 **take the spectra and to verify that it is one of the**
 12:11:56 6 **regulated asbestos minerals -- regulated asbestos**
 12:12:02 7 **types that is of issue, or any issue, for any of**
 12:12:06 8 **them.**
 12:12:06 9 Q. Do you conclude you're looking at a
 12:12:09 10 regulated asbestos prior to doing the ratio analysis?
 12:12:14 11 A. **No.**
 12:12:15 12 Q. Okay. So prior to determining there's --
 12:12:19 13 what you're looking at, what kind of mineral you're
 12:12:21 14 looking at, you determine the ratio of the metals to
 12:12:26 15 silicon; is that correct?
 12:12:28 16 A. **Before anything is done, we take the**
 12:12:30 17 **microchemistry of an individual fiber and look at the**
 12:12:34 18 **typical elements that you would expect.**
 12:12:38 19 Q. You seem to not want to answer about the
 12:12:40 20 EDXA.
 12:12:41 21 MR. CIRSCH: I don't think he was finished
 12:12:43 22 answering it.
 12:12:43 23 Q. (By Mr. Chachkes) All right. I'm talking
 12:12:44 24 about the EDXA.
 12:12:45 25 A. **That's what I'm saying.**

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12:12:46 1 Q. So you've got the EDXA result in your
 12:12:50 2 hands. This result, 12, before you've determined
 12:12:54 3 what it is, is the first step determining the ratio
 12:12:57 4 of metals to silicon --
 12:12:59 5 MR. CIRSCH: Object to form.
 12:13:00 6 Q. (By Mr. Chachkes) -- to interpret this
 12:13:01 7 EDXA?
 12:13:02 8 A. **The first step would be to look at this**
 12:13:04 9 **EDXA -- and I'm just speaking for me -- and I would**
 12:13:07 10 **see that the ratios are consistent with what I would**
 12:13:12 11 **expect for tremolite from the standards. That would**
 12:13:15 12 **be my first step.**
 12:13:17 13 Q. But you don't know whether those ratios
 12:13:20 14 are consistent with other minerals as well that are
 12:13:22 15 non-regulated?
 12:13:25 16 MR. CIRSCH: Object to form.
 12:13:26 17 THE WITNESS: I'm not aware of any ratios
 12:13:28 18 like that for any other non-regulated fibrous
 12:13:31 19 minerals.
 12:13:33 20 Q. (By Mr. Chachkes) Are you excluding the
 12:13:34 21 possibility that they exist, or you're saying you're
 12:13:36 22 just not aware?
 12:13:37 23 A. **We've never seen them, so I guess I'm**
 12:13:41 24 **excluding the possibility that they exist.**
 12:13:44 25 Q. Okay.

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12:13:45 1 A. **It's hard to prove a negative, but it is**
 12:13:48 2 **not one of the look-alikes of that type of ratio**
 12:13:52 3 **that's fibrous. And of course we're leaving out the**
 12:13:55 4 **SAED to make sure it has an amphibole type**
 12:13:59 5 **diffraction pattern.**
 12:14:00 6 Q. Prior to any EDXA, you've already
 12:14:04 7 determined it's an amphibole?
 12:14:05 8 A. **No. Nothing is determined about this**
 12:14:07 9 **particular structure other than it's fibrous, it**
 12:14:15 10 **meets the counting criteria for what would be a**
 12:14:19 11 **regulated asbestos fiber if in fact the chemistry in**
 12:14:23 12 **the crystalline structure are consistent with the**
 12:14:27 13 **appropriate mineral.**
 12:14:29 14 Q. Okay. You would agree that two different
 12:14:34 15 minerals can have similar EDXA readouts; correct?
 12:14:38 16 MR. CIRSCH: Object to form.
 12:14:39 17 THE WITNESS: It depends on what you mean
 12:14:40 18 by similar. I can't answer that hypothetical.
 12:14:46 19 Q. (By Mr. Chachkes) Okay. So, for example,
 12:14:52 20 anthophyllite and cummingtonite have similar EDXA
 12:14:56 21 spectra; correct?
 12:14:57 22 A. **That's correct. Anthophyllite, depending**
 12:15:01 23 **on the iron content, anthophyllite, cummingtonite,**
 12:15:07 24 **two regulated asbestos types, yes, they can have**
 12:15:10 25 **similar EDS.**

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12:15:11 1 Q. Okay. When you say EDS, you mean the same
 12:15:16 2 thing as EDXA?
 12:15:18 3 A. **Correct. I'm sorry. I'm old, and that's**
 12:15:20 4 **what we learned back in graduate school, it was EDS.**
 12:15:24 5 **It's hard for me to go to EDXA.**
 12:15:26 6 Q. All right. So you discussed your first
 12:15:27 7 step is to make some conclusions about what you're
 12:15:28 8 looking at just by eyeballing it.
 12:15:30 9 The next step, do you determine the ratios
 12:15:33 10 of the metals to the silicon?
 12:15:35 11 MR. CIRSCH: Object to form.
 12:15:36 12 THE WITNESS: Well, let's back up here. I
 12:15:38 13 don't make any conclusions by eyeballing it.
 12:15:41 14 The first thing we do is look at it and
 12:15:44 15 say this could match the counting rules for a
 12:15:48 16 regulated elongated particle.
 12:15:48 17 It's at least greater than .5 micrometers
 12:15:51 18 in length. These are measurements. These are
 12:15:53 19 not eyeballing. It has parallel sides and has
 12:15:56 20 at least a 5-to-1 aspect ratio or greater.
 12:16:00 21 Then the EDXA for me is taken to see if it
 12:16:07 22 is consistent with the ratios and patterns I
 12:16:11 23 would expect for some -- for the types of
 12:16:13 24 regulated asbestos fibers we're looking at.
 12:16:15 25 And we're not saying, okay, we're going to

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12:16:18 1 eliminate this type or that type. It's
12:16:21 2 whatever's present.

12:16:22 3 Then the SAED -- so it has a typical
12:16:25 4 amphibole diffraction pattern. If it's
12:16:27 5 anthophyllite, potentially, we'll rotate the
12:16:30 6 stage 10 to 20 degrees to eliminate the
12:16:33 7 once-in-a-blue-moon reflection of a fibrous talc
12:16:37 8 that some people claim that's close to
12:16:39 9 anthophyllite.

12:16:40 10 And after all that, then we would -- I
12:16:43 11 would say that is a regulated asbestos fiber
12:16:46 12 type. It meets all the criteria.

12:16:49 13 You keep saying eyeballing. That's not
12:16:52 14 really much of a term --

12:16:54 15 Q. (By Mr. Chachkes) My questions are all
12:16:55 16 about --

12:16:58 17 MR. CIRSCH: Wait, he's not finished.

12:16:59 18 THE WITNESS: Wait. I'm not done.

12:16:59 19 MR. CIRSCH: You cut him off.

12:16:59 20 THE REPORTER: Wait. Wait. Wait.

12:16:59 21 THE WITNESS: What we're doing is we're
12:17:01 22 looking at a set criteria. No decisions are
12:17:02 23 made ahead of time. Nothing is -- well, I
12:17:07 24 believe it's that type of thing. That doesn't
12:17:08 25 happen.

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12:18:02 1 tagged for silicon, magnesium, calcium, iron, or
12:18:07 2 whatever it happens to be, and the ratios are
12:18:09 3 fairly distinct compared to any other mineral
12:18:11 4 that I know out there, unless it's winchite or
12:18:15 5 richterite, and then we're looking at a little
12:18:17 6 bit of potassium or sodium.

12:18:21 7 Q. (By Mr. Chachkes) Okay. When you say the
12:18:21 8 ratios come up quick, do you mean a precise number
12:18:23 9 comes up on some screen?

12:18:24 10 A. **This ratio -- magnesium, silicon, calcium,**
12:18:30 11 **and iron -- is almost instantaneous. The only thing**
12:18:33 12 **that changes as you count, they all simultaneously**
12:18:39 13 **get higher. There is nothing else to it. You look**
12:18:41 14 **at that, you compare to the regulated standards, and**
12:18:46 15 **they all match.**

12:18:47 16 Q. Okay. Looking at Exhibit 12, tell me what
12:18:50 17 the ratios are there.

12:18:54 18 MR. CIRSCH: Object to form.

12:18:55 19 THE WITNESS: Say silicon is 10.

12:18:59 20 Magnesium and calcium is approximately 3. The
12:19:05 21 iron there would be less than 1.

12:19:08 22 Q. (By Mr. Chachkes) Okay. And that's how
12:19:10 23 you kind of do it in the real world when you're
12:19:13 24 analyzing EDXA spectra?

12:19:16 25 MR. CIRSCH: Object to form.

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12:17:08 1 Q. (By Mr. Chachkes) Let's start again. I'm
12:17:10 2 only asking questions about EDXA.

12:17:12 3 Can you agree with me not to answer about
12:17:14 4 TEM or SAED to the following sets of questions? I
12:17:19 5 just want to know how you do EDXA. Can you do that?

12:17:24 6 MR. CIRSCH: Object to form.

12:17:25 7 THE WITNESS: I've already explained that
12:17:26 8 to you.

12:17:26 9 Q. (By Mr. Chachkes) Okay. But can you
12:17:27 10 answer these following questions only referring to
12:17:28 11 EDXA? Can you do me that favor?

12:17:30 12 A. **No.**

12:17:31 13 Q. Okay.

12:17:31 14 A. **If I feel that the question needs more**
12:17:33 15 **explanation, an answer needs more explanation, I**
12:17:36 16 **believe that's my right.**

12:17:37 17 Q. Okay. You get the EDXA printout. At what
12:17:40 18 point, if at all, do you calculate the ratio of
12:17:44 19 metals to silicon for the EDXA?

12:17:48 20 MR. CIRSCH: Object to form.

12:17:49 21 THE WITNESS: I've already gone over that.
12:17:50 22 I can't say anything more.

12:17:53 23 If I'm sitting at the TEM, I'm looking at
12:17:56 24 the monitor and I'm determining -- and the
12:17:59 25 ratios come up fairly quick. We have them

12:19:16 1 THE WITNESS: In the real world we have
12:19:17 2 standards, and after doing it thousands and
12:19:20 3 thousands of times, that's how it's done.

12:19:24 4 Q. (By Mr. Chachkes) Okay. Basically the
12:19:25 5 way you just did it, I'm putting aside that you may
12:19:28 6 have an encyclopedic knowledge of what to compare the
12:19:31 7 ratios to. You generate ratios the way you've just
12:19:36 8 done it, you look at it and you just read it and you
12:19:39 9 come up with the ratios?

12:19:41 10 MR. CIRSCH: Object to form.

12:19:42 11 THE WITNESS: I'm not generating ratios.

12:19:44 12 The tremolite fiber or bundle is generating the
12:19:47 13 ratios by the x-rays that are being generated
12:19:51 14 from the electron beam that are being counted at
12:19:54 15 specific energies. Those ratios are fairly
12:19:57 16 standard.

12:19:58 17 What I do is interpret the overall pattern
12:20:02 18 and determine how well it matches with the
12:20:04 19 tremolite standards that are in each of the TEM
12:20:07 20 rooms.

12:20:07 21 Q. (By Mr. Chachkes) That step in the EDXA
12:20:11 22 analysis where you determine the ratios, do you do it
12:20:15 23 in the real world like we just saw now, you look at
12:20:22 24 the spectra and you say, okay, silicon 10, magnesium,
12:20:24 25 calcium 3, iron 1-ish, is that how you do it in the

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12:20:26 1 real world?
 12:20:27 2 MR. CIRSCH: Object to form.
 12:20:28 3 THE WITNESS: In the real world I don't --
 12:20:31 4 I look at the overall pattern, and the overall
 12:20:35 5 pattern is unique with the -- then it's an
 12:20:39 6 amphibole asbestos. And that's how every
 12:20:43 7 asbestos TEM lab in the country does it.
 12:20:45 8 Q. (By Mr. Chachkes) Okay. So does the
 12:20:51 9 ratios of metal to silicon in the EDXA analysis have
 12:20:57 10 a material impact on your conclusions about what
 12:21:00 11 you're looking at?

12:21:02 12 MR. CIRSCH: Object to form.
 12:21:03 13 THE WITNESS: The elemental spectra always have a material impact on what I'm
 12:21:06 14 looking at in the EDXA.
 12:21:10 16 Q. (By Mr. Chachkes) I didn't ask about
 12:21:11 17 that. I asked about the specific ratio of metals to
 12:21:15 18 silicon.
 12:21:16 19 Does that particular numerical ratio have
 12:21:20 20 a material impact on how you conclude what you're
 12:21:23 21 looking at under the EDXA?
 12:21:25 22 MR. CIRSCH: Object to form.
 12:21:26 23 THE WITNESS: I don't understand the
 12:21:27 24 question. I think I've answered it over and
 12:21:29 25 over. I'll answer it one more time.

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12:22:35 1 and then the iron depends on if we're going to
 12:22:40 2 call it actinolite or tremolite. That's how I
 12:22:42 3 do it.
 12:22:43 4 Q. (By Mr. Chachkes) Okay. Do you calculate
 12:22:44 5 the ratio of metals to silicon? Do you do that?
 12:22:47 6 MR. CIRSCH: Object to form.
 12:22:49 7 THE WITNESS: I think I've told you at
 12:22:53 8 least a half hour ago that I don't get a ruler
 12:22:56 9 out and measure each of the primary elements
 12:22:58 10 we're dealing with here, magnesium, silicon and
 12:23:03 11 calcium. I look at these distinct patterns,
 12:23:06 12 EDXA patterns, and can look at that and tell you
 12:23:10 13 that that is what matches for regulated
 12:23:13 14 tremolite asbestos.
 12:23:14 15 Q. (By Mr. Chachkes) Okay. Putting aside
 12:23:15 16 that you don't get a ruler out, do you kind of sort
 12:23:20 17 of estimate that ratio of metals to silicon in your
 12:23:24 18 head when you do this analysis?
 12:23:25 19 MR. CIRSCH: Alex, he's answered this
 12:23:27 20 question a number of times.
 12:23:28 21 MR. CHACHKES: No, he said he doesn't take
 12:23:30 22 out a ruler.
 12:23:31 23 MR. CIRSCH: A number of different times
 12:23:32 24 he's testified as to how he does the process.
 12:23:34 25 I'll let him answer it one more time and then

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12:21:32 1 Q. (By Mr. Chachkes) No, no. I want to make
 12:21:33 2 sure you understand it.
 12:21:34 3 Do you understand what I mean by the ratio
 12:21:36 4 of metals to silicon; do you understand that?
 12:21:39 5 A. Yes, sir.
 12:21:40 6 Q. Okay. Do you calculate that number in
 12:21:45 7 your head, write it down, print it out? Do you
 12:21:48 8 calculate that number?
 12:21:50 9 MR. CIRSCH: Object to form.
 12:21:51 10 THE WITNESS: I don't know how I do it.
 12:21:56 11 Tremolite, the ratios to magnesium, silicon, and
 12:22:00 12 calcium are fairly unique. Not aware of any
 12:22:03 13 other fibrous materials that will have those
 12:22:06 14 specific ratios without some other additional
 12:22:08 15 elements such as aluminum and an amphibole
 12:22:12 16 diffraction pattern.
 12:22:13 17 Q. (By Mr. Chachkes) Okay. You keep
 12:22:15 18 answering a different question, but what I heard is
 12:22:16 19 that you don't calculate the ratio. You actually run
 12:22:20 20 the numbers and calculate the ratios of metal to
 12:22:23 21 silicon; is that correct? You don't run that number?
 12:22:25 22 MR. CIRSCH: Object to form.
 12:22:26 23 THE WITNESS: I look at -- when I'm doing
 12:22:28 24 this, I look at every pattern and compare it to
 12:22:32 25 the standard patterns for those three elements,

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12:23:37 1 I'm going to instruct him not to answer --
 12:23:38 2 MR. CHACHKES: You're at perfect liberty
 12:23:39 3 to shut the questions down at any point.
 12:23:40 4 MR. CIRSCH: I know. I'm going to let him
 12:23:41 5 do it one more time.
 12:23:42 6 MR. CHACHKES: Okay.
 12:23:43 7 Q. (By Mr. Chachkes) Do you estimate --
 12:23:44 8 putting aside whether you use a ruler or not to make
 12:23:45 9 it exact, do you estimate the ratio of metal to
 12:23:48 10 silicon in the EDXA spectra?
 12:23:50 11 A. For at least the tenth time, and my last
 12:23:53 12 time, when I generate a spectra of -- and I'll just
 12:23:59 13 call it right now suspected regulated tremolite, I
 12:24:03 14 look at the overall pattern for magnesium, silicon,
 12:24:07 15 and calcium and determine that it is consistent with
 12:24:11 16 the standards, and that's how I make that
 12:24:14 17 determination.
 12:24:14 18 Q. And is that overall pattern that you say
 12:24:16 19 you look at, is that the ratio of metals to silicon?
 12:24:21 20 A. I am not answering this question anymore.
 12:24:24 21 MR. CIRSCH: Object to form. That's it.
 12:24:25 22 Q. (By Mr. Chachkes) All right. So you will
 12:24:26 23 not answer that question?
 12:24:28 24 A. I've answered the question I'm estimating
 12:24:31 25 at least ten times.

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12:24:33 1 Q. Okay. And you won't come back at some
12:24:36 2 point and say, yes, indeed, I calculate a number that
12:24:41 3 is the ratio of metals to silicon. You won't come
12:24:43 4 back and say that, will you?

12:24:43 5 MR. CIRSCH: Object to form.

12:24:44 6 Don't answer the question, Dr. Longo.

12:24:45 7 Move on, please, Counsel.

12:24:47 8 Q. (By Mr. Chachkes) Okay. Is the ratio of
12:24:52 9 metals to silicon for tremolite the same for every
12:24:55 10 EDXA printout?

12:25:00 11 A. I think I've already gone over it a couple
12:25:04 12 of times that depending on your detector, your EDXA
12:25:08 13 detector, if it is a silicon drifted, lithium drifted
12:25:13 14 window or windowless detector, these ratios will
12:25:17 15 change because it's more sensitive.

12:25:19 16 For example, for chrysotile, even though
12:25:21 17 there is more magnesium in the formula than silicon,
12:25:28 18 regular -- with a silicon window you will see less
12:25:32 19 magnesium. So it just depends on the EDS system.

12:25:38 20 We have both types. So you could see a
12:25:40 21 tremolite spectra from the windowless detector that
12:25:45 22 will look different than the other one as you're
12:25:47 23 getting ready to pull out.

12:25:48 24 Q. Are you aware that anthophyllite has a
12:25:51 25 ratio in the books published to be 7 to 8 for metals
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12:26:49 1 tremolite has a published ratio for EDXA metals to
12:26:52 2 silicon of 5-to-8?

12:26:55 3 MR. CIRSCH: Object to form.

12:26:55 4 THE WITNESS: Published where?

12:26:57 5 MR. CIRSCH: Yeah, will you show him the
12:26:58 6 document if your --

12:26:59 7 Q. (By Mr. Chachkes) Are you aware of any
12:27:00 8 publication that has that?

12:27:01 9 A. I don't know. Show me the publication and
12:27:03 10 I'll take a look at it, and I'll have to look at what
12:27:07 11 conditions this ratio is for what type of detector.

12:27:11 12 Q. Okay. So sitting here today, you can't
12:27:14 13 point me to a peer-reviewed publication that has
12:27:17 14 anything other than a 5-to-8 ratio for tremolite?

12:27:24 15 MR. CIRSCH: Object to form. You're
12:27:26 16 holding something in your hand. Why don't you
12:27:28 17 show --

12:27:28 18 THE WITNESS: I don't know. I'd have to
12:27:29 19 look at the publication. We look at the NIST
12:27:31 20 standards for determining if we have tremolite,
12:27:34 21 anthophyllite, anthophyllite solid solution
12:27:37 22 series, the tremolite solid solution series.

12:27:39 23 Q. (By Mr. Chachkes) Do the NIST standards
12:27:41 24 have ratios of metals to silicon?

12:27:43 25 A. The NIST -- as I think we already talked
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12:25:56 1 to silicon? Are you aware of that?

12:25:58 2 MR. CIRSCH: Object to form.

12:25:58 3 THE WITNESS: I don't know. I would have
12:25:59 4 to look at it.

12:26:00 5 Q. (By Mr. Chachkes) Okay. And you're not
12:26:02 6 looking to see whether there's a ratio of 7 to 8
12:26:05 7 metals to silicon, are you?

12:26:07 8 MR. CIRSCH: Object to form.

12:26:08 9 THE WITNESS: For anthophyllite, we look
12:26:10 10 at the EDXA standards, typically the NIST
12:26:16 11 standards, for that pattern -- I've already told
12:26:18 12 you I don't get out a ruler and measure these --
12:26:22 13 that the spectra has to be consistent, and it
12:26:25 14 has to be for the type of EDXA detector you're
12:26:29 15 using.

12:26:29 16 Q. (By Mr. Chachkes) It's a very simple
12:26:31 17 question. Do you look for a 7 to 8 ratio metals to
12:26:35 18 silicon --

12:26:35 19 MR. CIRSCH: Object to form.

12:26:36 20 THE WITNESS: And it's a very simple
12:26:38 21 answer. We look at the standard NIST type
12:26:40 22 spectras that give you the patterns for
12:26:42 23 potentially anthophyllite or potentially fibrous
12:26:46 24 talc.

12:26:48 25 Q. (By Mr. Chachkes) Are you aware that

12:27:45 1 about, I don't believe the NIST standards sends you
12:27:47 2 any information other than this is tremolite or this
12:27:49 3 is anthophyllite or this is actinolite or this is
12:27:53 4 crocidolite or this is amosite.

12:27:54 5 Q. Okay.

12:27:54 6 MR. CIRSCH: As soon as you get to a good
12:27:56 7 place, Alex, maybe we can take a lunch break.

12:27:59 8 MR. CHACHKES: Okay.

12:27:59 9 Q. (By Mr. Chachkes) Do you know what the
12:27:59 10 International Mineralogical Association is, the IMA?

12:28:04 11 A. I don't know.

12:28:06 12 Q. Okay. Are you aware -- so I guess you
12:28:10 13 wouldn't be aware they contain a comprehensive list
12:28:14 14 of minerals in their chemical formulas?

12:28:16 15 MR. CIRSCH: Object to form.

12:28:17 16 THE WITNESS: I'm sure they do.

12:28:18 17 Q. (By Mr. Chachkes) Have you ever looked at
12:28:20 18 that?

12:28:20 19 A. I don't know.

12:28:29 20 Q. Okay. So would you agree with the
12:28:31 21 statement that talc and anthophyllite have materially
12:28:35 22 similar chemistries so it can be difficult to
12:28:38 23 distinguish them on EDXA?

12:28:41 24 MR. CIRSCH: Object to form.

12:28:42 25 THE WITNESS: Yes and maybe.

12:28:45 1 Q. (By Mr. Chachkes) Okay. What part is
12:28:46 2 yes?
12:28:47 3 A. **Yes, they have similar chemical makeup.**
12:28:50 4 Q. And maybe they can be difficult to
12:28:52 5 distinguish on EDXA?
12:28:53 6 A. **Maybe, depending on the chemistry. But we**
12:29:00 7 **don't distinguish fibrous talc from anthophyllite by**
12:29:05 8 **just EDXA.**
12:29:06 9 Q. Okay. Am I correct that it can be
12:29:09 10 difficult under EDXA to distinguish anthophyllite
12:29:14 11 from talc?
12:29:16 12 MR. CIRSCH: Object to form.
12:29:17 13 THE WITNESS: I don't know about how
12:29:18 14 difficult or not difficult. It's not something
12:29:20 15 we do to distinguish anthophyllite from talc
12:29:22 16 just on the EDXA other than, okay, it has the
12:29:25 17 appropriate chemistry.
12:29:28 18 MR. CHACHKES: Okay. We can take a break
12:29:32 19 here. Lunchtime.
12:29:33 20 (Lunch recess from 12:29 p.m. to 1:35 p.m.)
13:36:03 21 Q. (By Mr. Chachkes) Dr. Longo, you had
13:37:02 22 mentioned before that you had looked at industrial
13:37:05 23 talc for asbestos; is that correct?
13:37:06 24 A. **Yes.**
13:37:07 25 Q. And for whom did you do that work?

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13:37:10 1 A. **For whom? Which plaintiffs' attorney?**
13:37:13 2 Q. Sure.
13:37:14 3 A. **I don't recall.**
13:37:18 4 Q. For what client, company, did you do that
13:37:20 5 work?
13:37:21 6 A. **I haven't done any work for any client**
13:37:29 7 **companies that I'm at liberty to talk about for**
13:37:38 8 **industrial talc.**
13:37:45 9 Q. Okay. I'm just asking you yes or no, do
13:37:48 10 you remember the names of the companies or company?
13:37:50 11 A. **I can't talk about any potential work we**
13:37:53 12 **may or may not have done for an industrial talc**
13:37:56 13 **company.**
13:37:56 14 Q. No, this is just a yes or no. Do you
13:37:58 15 remember the name? I'm not asking for the name, just
13:38:01 16 do you remember the name?
13:38:03 17 A. **Again, I'm not saying I have or I haven't.**
13:38:06 18 **I'm just not at liberty if I have and if no report**
13:38:10 19 **has been issued, at liberty to talk about it.**
13:38:13 20 Q. Okay. You mentioned that you might have
13:38:15 21 looked at industrial talc for plaintiff lawyers. Was
13:38:18 22 that recent?
13:38:19 23 A. **I think the most recent one was back in**
13:38:21 24 **2017 for the Kazan firm.**
13:38:24 25 Q. Okay. And you just don't know whether

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13:38:26 1 that was associated with a particular company?
13:38:30 2 A. **Oh, the company, it was Nytal Vanderbilt**
13:38:35 3 **talc.**
13:38:35 4 Q. Okay. But this is plaintiffs' side?
13:38:39 5 A. **Yes, sir.**
13:38:39 6 Q. What about the first time you ever looked
13:38:43 7 at industrial talc for asbestos, when was that?
13:38:45 8 A. **As I testified earlier, sometime in the**
13:38:47 9 **1990s or early 2000s.**
13:38:50 10 Q. Was that one engagement? Multiple
13:38:56 11 engagements?
13:38:57 12 A. **I don't recall.**
13:38:58 13 Q. It could be one engagement; you just don't
13:39:00 14 remember?
13:39:01 15 A. **I'm sure it's more, but I just don't**
13:39:02 16 **recall.**
13:39:03 17 Q. Greater than five? Less than five?
13:39:05 18 A. **I don't know what size bread box it is.**
13:39:09 19 Q. Okay. So you've established probably more
13:39:12 20 than one, but after that you can't say?
13:39:14 21 A. **I just don't recall.**
13:39:15 22 Q. Okay. What about more than one; you can
13:39:17 23 say it's more than one?
13:39:19 24 MR. CIRSCH: Object to form.
13:39:20 25 THE WITNESS: I believe so.

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13:39:21 1 Q. (By Mr. Chachkes) Okay. And did you
13:39:22 2 personally do the TEM work on that?
13:39:23 3 A. **Back in those days, probably.**
13:39:27 4 Q. Did you do any -- personally do any PLM
13:39:30 5 work?
13:39:30 6 A. **No.**
13:39:30 7 Q. Personally do any XRD work?
13:39:32 8 A. **No.**
13:39:32 9 Q. Personally do any EDXA work?
13:39:35 10 A. **Well, when I do TEM for this type of work,**
13:39:38 11 **I would have done EDXA.**
13:39:40 12 Q. Okay. Can you estimate in that engagement
13:39:44 13 or engagements in the 1990s, early 2000s range, how
13:39:49 14 many hours you would have spent?
13:39:51 15 A. **No.**
13:39:52 16 Q. Could be under ten; could be over ten?
13:39:55 17 A. **I don't recall.**
13:39:56 18 Q. You know who McCrone is; right?
13:39:59 19 A. **I do.**
13:40:00 20 Q. You know they have people there who teach
13:40:02 21 graduate courses related to detecting asbestos?
13:40:05 22 MR. CIRSCH: Object to form.
13:40:06 23 THE WITNESS: I know they have continuing
13:40:10 24 education courses, yes.
13:40:11 25 Q. (By Mr. Chachkes) Have you ever taught at

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13:40:12 1 a graduate school?

13:40:14 2 A. Not in this type of work, no.

13:40:16 3 Q. Okay. In what type of work?

13:40:19 4 A. Well, I was visiting assistant professor,

13:40:21 5 so it would have been materials science.

13:40:23 6 Q. Okay. Nothing to do with detecting

13:40:24 7 asbestos?

13:40:25 8 A. No.

13:40:25 9 Q. Do you know McCrone's Particle Atlas?

13:40:28 10 A. Yes.

13:40:28 11 Q. And that's something folks other than

13:40:31 12 McCrone use as a standard in this field?

13:40:36 13 A. Yes.

13:40:36 14 Q. Have you ever published anything that

13:40:39 15 other people outside of your lab use as a standard?

13:40:43 16 MR. CIRSCH: Object to form.

13:40:45 17 THE WITNESS: Not in a book, no.

13:40:47 18 Q. (By Mr. Chachkes) What about otherwise?

13:40:50 19 A. Yes, if you go to Federal Mogul's and

13:40:54 20 search for wollastonite detection, one of our

13:40:58 21 protocols was published by them for the determination

13:41:02 22 of tremolite asbestos in wollastonite for Federal

13:41:07 23 Mogul involving their manufacture of OEM brakes.

13:41:11 24 Q. What is Federal Mogul? I'm not familiar

13:41:12 25 with that.

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13:41:12 1 A. It's a company that owns a bunch of

13:41:14 2 companies.

13:41:14 3 Q. Okay. So you published -- I'm sorry, say

13:41:20 4 it again. What does it stand for?

13:41:22 5 A. Well, I didn't publish it. We wrote a

13:41:25 6 protocol for determining a problem they were having

13:41:29 7 with the supplier of a mineral called wollastonite,

13:41:29 8 which is a substitute fibrous material, and the

13:41:31 9 particular source that they were using stated that it

13:41:36 10 had a small amount of tremolite contamination in it.

13:41:38 11 Q. Okay. Did you ever published a standard

13:41:40 12 for finding asbestos that was for the general

13:41:44 13 scientific community, not for just one specific

13:41:49 14 client?

13:41:49 15 MR. CIRSCH: Object to form.

13:41:50 16 THE WITNESS: I was in charge of the ASTM

13:41:52 17 and the D2205 committee for the analysis of --

13:41:57 18 number count analysis of asbestos in settled

13:42:01 19 dust. It's the D5755, I believe it is.

13:42:05 20 Q. (By Mr. Chachkes) Okay. And that has

13:42:08 21 your name on it?

13:42:09 22 A. No. ASTM standards have ASTM on it.

13:42:13 23 Q. Okay. And that was -- that standard --

13:42:16 24 the contributors were many more people than you;

25 right?

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13:42:19 1 A. Yes. Some people contributed, but I was

13:42:22 2 in charge of -- it was our method that we had given

13:42:25 3 to the EPA. Then it was fighting over the

13:42:30 4 definitions.

13:42:31 5 Q. Have you or MAS published any standard for

13:42:35 6 finding asbestos in any material or any mineral or

13:42:39 7 anywhere that is attributable exclusively to you or

13:42:43 8 MAS?

13:42:43 9 A. No.

13:42:44 10 Q. Have you published a methodology for

13:42:55 11 finding asbestos in talc?

13:42:57 12 A. Have not.

13:42:59 13 Q. You're aware that McCrone has done that;

13:43:01 14 right?

13:43:01 15 MR. CIRSCH: Object to form.

13:43:02 16 THE WITNESS: Jim Millette, yes, I'm

13:43:05 17 aware, 1990 and 2015, I believe, are the two

13:43:09 18 papers in Microscopy.

13:43:10 19 Q. (By Mr. Chachkes) You're aware that

13:43:11 20 McCrone has testing and training classes related to

13:43:14 21 finding asbestos; correct?

13:43:15 22 MR. CIRSCH: Object to form.

13:43:16 23 THE WITNESS: They teach a -- used to,

13:43:19 24 anyway, the McCrone Institute. May still do it.

13:43:25 25 Q. (By Mr. Chachkes) Have you ever taught or

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13:43:30 1 trained -- sponsored teaching or training classes for

13:43:34 2 finding asbestos for people outside of MAS?

13:43:36 3 A. I've given a couple lectures and taught an

13:43:39 4 all-day two-day seminar at the American Industrial

13:43:44 5 Hygiene Association to help train, to give certified

13:43:48 6 industrial hygienists or industrial hygienists how to

13:43:51 7 perform TEM analysis for asbestos.

13:43:54 8 Q. Okay. Other than that, any?

13:43:57 9 A. At Georgia Tech in their continuing

13:44:00 10 education program involving asbestos, seminar up at

13:44:06 11 Southern University of New York, I have taught there

13:44:13 12 for a week. Again, it was TEM analysis for asbestos.

13:44:19 13 Q. Okay. Was it for finding talc, asbestos

13:44:24 14 in talc?

13:44:25 15 A. No, it was just general finding asbestos

13:44:28 16 in whatever you wanted to look in.

13:44:30 17 Q. Have you or MAS given any training or

13:44:36 18 classes relating to finding asbestos in talc?

13:44:39 19 A. No.

13:44:39 20 Q. Has any School of Public Health asked you

13:44:43 21 to assist them in finding asbestos in talc?

13:44:46 22 A. No.

13:44:47 23 Q. You're aware that a number of governmental

13:44:51 24 bodies are out there, not just in the U.S. but

13:44:54 25 elsewhere, looking into the question of whether

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13:44:58 1 asbestos is in cosmetic talc; correct?
 13:45:01 2 MR. CIRSCH: Object to form.
 13:45:02 3 THE WITNESS: I'm aware of Canada and
 13:45:06 4 maybe India, maybe. I've seen some articles.
 13:45:07 5 Q. (By Mr. Chachkes) Okay. Have any of
 13:45:07 6 those -- any governmental body, U.S. or otherwise,
 13:45:10 7 asked you to assist in determining whether cosmetic
 13:45:13 8 talc has asbestos?
 13:45:15 9 MR. CIRSCH: Object to form.
 13:45:16 10 THE WITNESS: No.
 13:45:18 11 Q. (By Mr. Chachkes) Has any federal court
 13:45:20 12 ever said that your methodology for finding talc
 13:45:23 13 in -- asbestos in talc passes Daubert standards?
 13:45:30 14 A. I'm not sure I've had a Daubert standard
 13:45:32 15 in federal court yet. As for state court, I think
 13:45:36 16 there's been seven, six or seven challenges.
 13:45:39 17 Q. So my question is about federal court.
 13:45:41 18 Has any federal court certified you under Daubert
 13:45:43 19 standards for finding asbestos in talc?
 13:45:45 20 MR. CIRSCH: Object to form.
 13:45:46 21 THE WITNESS: As I just stated, I don't
 13:45:48 22 believe I've been in federal court yet other
 13:45:50 23 than this one for -- where any Daubert
 13:45:56 24 challenges would arise.
 13:45:57 25 Q. (By Mr. Chachkes) Has your methodology

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13:45:59 1 for finding asbestos in talc ever been published in a
 13:46:04 2 peer-review journal or literature otherwise?
 13:46:05 3 MR. CIRSCH: Object to form.
 13:46:06 4 THE WITNESS: Well, it's not my method,
 13:46:08 5 and the Blount method by PLM has been published
 13:46:13 6 and the ISO 22262-2 is an international
 13:46:16 7 standard. So it's not my method; it's standard
 13:46:20 8 protocols for doing the method.
 13:46:21 9 Q. (By Mr. Chachkes) Is all your analysis
 13:46:23 10 for -- all your analysis of cosmetic talc for
 13:46:27 11 asbestos been for and sponsored by plaintiffs'
 13:46:30 12 lawyers?
 13:46:31 13 A. Yes.
 13:46:31 14 Q. You mentioned the NVLA. What is that?
 13:46:36 15 A. National Voluntary Laboratory
 13:46:41 16 Accreditation Program for the determination of
 13:46:42 17 asbestos in air samples by TEM and bulk analysis.
 13:46:47 18 Q. Does the NVLA have an accreditation for
 13:46:52 19 finding asbestos in talc?
 13:46:54 20 A. It's hard to say because they don't really
 13:47:01 21 dictate what the matrix is.
 13:47:04 22 Q. When you say matrix, what do you mean by
 13:47:06 23 that?
 13:47:06 24 A. Well, it's just asbestos in materials.
 13:47:09 25 I'm not sure they have a specific one for talc or a

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13:47:13 1 specific one for joint compound or a specific one for
 13:47:17 2 thermal insulation. It's just a matter of being able
 13:47:23 3 to determine and detect and to record what is
 13:47:27 4 present.
 13:47:28 5 Q. Okay. Does the NVLA have an accreditation
 13:47:33 6 standard for finding talc in something other than
 13:47:36 7 air, like in -- I'm sorry, strike that.
 13:47:37 8 Does the NVLA have an accreditation
 13:47:41 9 standard for finding asbestos in something other than
 13:47:43 10 air, like in talc?
 13:47:44 11 MR. CIRSCH: Object to form.
 13:47:45 12 THE WITNESS: Well, they accredited to the
 13:47:48 13 EPA 600/R-93 PLM method. That's not specific
 13:47:53 14 for talc. It's building materials.
 13:47:56 15 Q. (By Mr. Chachkes) And do they credit
 13:47:58 16 you for methodology or something else?
 13:48:01 17 A. To be able to perform the analysis.
 13:48:04 18 Q. Meaning what?
 13:48:06 19 A. Meaning if you -- we have round-robbins
 13:48:10 20 that you can adequately identify products that have a
 13:48:14 21 certain concentration of asbestos in it that you
 13:48:16 22 would routinely see for building products.
 13:48:18 23 Q. Has NVLA ever accredited you specifically
 13:48:21 24 for finding talc in asbestos?
 13:48:24 25 A. I think, as I've already stated, they

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13:48:26 1 don't have a previous matrix, meaning what is the
 13:48:29 2 asbestos in. They go by the EPA 600/R-93 method for
 13:48:36 3 analysis of bulk samples, typically building material
 13:48:40 4 bulk samples for asbestos.
 13:48:41 5 Q. So the NVLA, did they actually have
 13:48:44 6 someone come to your lab and do this accreditation?
 13:48:46 7 A. Yes.
 13:48:46 8 Q. Okay. When that person came to your lab
 13:48:47 9 for the accreditation, did they ask to see your
 13:48:51 10 techniques and methodologies for finding asbestos in
 13:48:53 11 talc?
 13:48:54 12 MR. CIRSCH: Object to form.
 13:48:55 13 THE WITNESS: Again, they don't say talc
 13:48:57 14 and they don't say any particular thing. It's
 13:48:58 15 just your overall methodology for performing the
 13:49:01 16 analysis. And usually the auditor will bring
 13:49:07 17 samples and have the analyst be able to
 13:49:10 18 determine the type and the estimated weight
 13:49:14 19 percent of what's in the sample.
 13:49:15 20 Q. (By Mr. Chachkes) Okay. So the samples
 13:49:18 21 that the NVLA brought for you to analyze for your
 13:49:22 22 accreditation were not talc samples; correct?
 13:49:25 23 A. I don't believe so, no.
 13:49:25 24 Q. They were just straight-up samples of
 13:49:28 25 different kinds of asbestos; right?

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13:49:30 1 A. In some building material.
 13:49:32 2 Q. Okay. Is the NVLA accreditation standard
 13:49:38 3 public?
 13:49:39 4 A. When you -- I don't understand what you
 13:49:40 5 mean.
 13:49:40 6 Q. Obviously, they must have some standard
 13:49:42 7 that they're comparing you to. Is that written down,
 13:49:44 8 or is it just in the minds of the NVLA?
 13:49:49 9 MR. CIRSCH: Form.
 13:49:50 10 THE WITNESS: I mean, there is a set this
 13:49:50 11 is what you have to do and be able to do, plus
 13:49:54 12 the PAT rounds that's sent out by the Research
 13:50:02 13 Triangle Institute where they send samples out,
 13:50:05 14 your analysts have to analyze them and send them
 13:50:08 15 in, and they compare to see if you pass or fail.
 13:50:10 16 Q. (By Mr. Chachkes) Okay. My question was
 13:50:14 17 do they have published standards?
 13:50:16 18 MR. CIRSCH: Object to form.
 13:50:17 19 Q. (By Mr. Chachkes) Something written down
 13:50:17 20 where I can look at it and read on the page, ah, this
 13:50:20 21 is how they accredit me?
 13:50:22 22 MR. CIRSCH: Object to form.
 13:50:23 23 THE WITNESS: I think you can go to the
 13:50:24 24 NIST website for this type of -- and download
 13:50:29 25 it. I'm sure it's public.

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13:51:46 1 A. I believe so.
 13:51:47 2 Q. Okay. And you said you brought something.
 13:51:49 3 What did you bring?
 13:51:50 4 A. Well, I brought the EDXA on 200 tremolite
 13:51:55 5 fibers and bundles that was done, the 1867.
 13:52:01 6 Q. Oh, I'm sorry, so this is something you've
 13:52:04 7 already produced; you just brought it -- also brought
 13:52:05 8 it?
 13:52:06 9 A. Yes.
 13:52:08 10 Q. Okay.
 13:52:06 11 A. I mean, it's in my reliance documents, and
 13:52:08 12 it can give you a -- if you look at the ratios,
 13:52:14 13 they're pretty much identical to what you were
 13:52:16 14 showing me here.
 13:52:17 15 Q. Okay. And did you bring any other
 13:52:25 16 documents that haven't been produced?
 13:52:27 17 Did you bring any documents that haven't
 13:52:28 18 been produced?
 13:52:29 19 A. Well, these have been produced.
 13:52:31 20 Q. Right. So I'm asking separate and apart
 13:52:33 21 from that.
 22 A. Oh.
 13:52:34 23 Q. Did you bring any documents today that
 13:52:35 24 haven't been produced?
 13:52:36 25 A. No.

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13:50:32 1 Q. (By Mr. Chachkes) Now, you've run NIST
 13:50:36 2 standards for EDSA; correct?
 13:50:39 3 A. Correct.
 13:50:39 4 Q. How often do you run those?
 13:50:43 5 A. I think you asked me earlier. I don't
 13:50:45 6 recall. I brought some here because since we were
 13:50:48 7 looking at the EDXA or talking about EDXA of
 13:50:53 8 tremolite, it's in my reliance documents where we
 13:50:56 9 measured the EDXA on 200 tremolite fibers and bundles
 13:51:02 10 showing you the, quote, pattern.
 13:51:06 11 Q. I'm sorry, you're talking about the NIST
 13:51:08 12 standard right now?
 13:51:08 13 A. Yes.
 13:51:09 14 Q. Okay. So you analyzed 200 NIST standards?
 13:51:11 15 A. Well, 200 particles in a NIST standard.
 13:51:13 16 Q. Okay. So you've at least done one NIST
 13:51:16 17 standard. Have you done more than one NIST standard?
 13:51:19 18 A. We have analyzed all the NIST standards to
 13:51:26 19 generate standards of EDXA.
 13:51:29 20 Q. Same for SAED?
 13:51:31 21 A. Yes.
 13:51:32 22 Q. Same for TEM?
 13:51:35 23 A. Well, TEM would be EDXA and SAED.
 13:51:39 24 Q. Okay. And do you keep those materials,
 13:51:45 25 the standards you run?

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13:52:36 1 Q. Okay. So those are your NIST samples for
 13:52:45 2 EDXA; right?
 13:52:47 3 A. Right. We were looking at the
 13:52:48 4 Addison-Davies method to see if boiling the acid --
 13:52:52 5 boiling the tremolite in sulfuric acid for an hour
 13:52:56 6 and then boiling it in sodium hydroxide for an hour,
 13:53:00 7 did it change any chemical component or size
 13:53:03 8 distribution of the NIST standard.
 13:53:05 9 Q. Did you produce your NIST standard
 13:53:07 10 analysis for TEM?
 13:53:11 11 A. That is TEM.
 13:53:11 12 Q. Okay. All right. For what about PLM, did
 13:53:15 13 you produce those?
 13:53:16 14 A. No.
 13:53:16 15 MR. CIRSCH: Object to form.
 13:53:18 16 THE WITNESS: You typically -- since it's
 13:53:21 17 almost 100 percent tremolite, it's not usually a
 13:53:23 18 standard that you develop for PLM. You can look
 13:53:25 19 at it and check your refractive indices and make
 13:53:30 20 sure -- the oblique extinction, et cetera, but
 13:53:34 21 you don't usually just run those.
 13:53:36 22 Q. (By Mr. Chachkes) Okay. So when you say
 13:53:37 23 you don't usually, you did not run NIST standards for
 13:53:40 24 PLM; is that what I'm hearing?
 13:53:42 25 A. I don't know if we have. I don't believe

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13:53:44 1 so.
 13:53:44 2 Q. Okay. If you did, would you have kept the
 13:53:47 3 material?
 13:53:48 4 MR. CIRSCH: Object to form.
 13:53:49 5 THE WITNESS: I don't know.
 13:53:50 6 Q. (By Mr. Chachkes) Okay. We would ask any
 13:53:51 7 of that material be produced.
 13:53:54 8 Any other NIST standards that you ran
 13:53:57 9 under any other instruments that we haven't talked
 13:53:59 10 about?
 13:53:59 11 A. No.
 13:54:14 12 MS. TROVATO: I'm sorry, I have Exhibit 10
 13:54:15 13 to this deposition --
 13:54:16 14 MR. CIRSCH: That's been marked at a
 13:54:18 15 previous deposition.
 13:54:18 16 THE WITNESS: That was marked on 3/21.
 17 MS. TROVATO: I want to mark it here.
 13:54:21 18 MR. CHACHKES: Okay. Can we mark this as
 13:54:22 19 Exhibit 14.
 13:54:24 20 (Defendants' Exhibit 14 was marked for
 13:54:33 21 identification.)
 13:54:33 22 Q. (By Mr. Chachkes) Okay. So Exhibit 14 is
 13:54:34 23 what you were just referring to as the -- you ran a
 13:54:37 24 NIST standard and the Addison-Davies technique,
 13:54:39 25 that's 14; right?

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13:54:40 1 A. Yes, sir.
 13:54:40 2 Q. Okay. Looking back at -- can you go back
 13:54:46 3 to Exhibit 12, which is the EDXA spectrum.
 13:54:54 4 If I handed this to a very experienced
 13:55:00 5 EDXA scientist, as experienced as you want, and I
 13:55:06 6 gave him no context where it came from, you know,
 13:55:12 7 anything other than just this printout, would they
 13:55:14 8 identify this as tremolite and only tremolite?
 13:55:17 9 MR. CIRSCH: Object to form.
 13:55:18 10 THE WITNESS: I can't opine about what
 13:55:20 11 other people would do. If I looked at this, my
 13:55:24 12 reaction would be that looks like tremolite.
 13:55:27 13 Q. (By Mr. Chachkes) Okay. I'm not talking
 13:55:28 14 about you. Again, this is about the question of what
 13:55:32 15 a third-party would and how they would interpret
 13:55:37 16 this.
 13:55:37 17 Would somebody who is a very experienced
 13:55:39 18 EDXA scientist look at this spectra and say I know
 13:55:47 19 what this is, this is tremolite? Or are there other
 13:55:50 20 minerals that are consistent with this?
 13:55:53 21 MR. CIRSCH: Object to form.
 13:55:54 22 THE WITNESS: I can't speculate on what
 13:55:55 23 other experienced TEM folks would do. I can
 13:55:58 24 just tell you, since I'm sitting here, that I
 13:56:02 25 would say that's probably tremolite.

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13:56:04 1 Q. (By Mr. Chachkes) Okay. Again, I know
 13:56:05 2 what you think. So these questions aren't about what
 13:56:08 3 you think.
 13:56:09 4 Do you think a third-party scientist
 13:56:11 5 looking at Exhibit 12, without knowing context, just
 13:56:15 6 looking at what's in Exhibit 12, this EDSA spectrum,
 13:56:18 7 might say that also corresponds to minerals that
 13:56:23 8 aren't tremolite?
 13:56:25 9 MR. CIRSCH: Object to form. He's already
 13:56:26 10 answered the question. It calls for
 13:56:28 11 speculation.
 13:56:28 12 THE WITNESS: I can't speculate what other
 13:56:30 13 experienced microscopists would say that is.
 13:56:34 14 Q. (By Mr. Chachkes) Okay. And so you can't
 13:56:36 15 testify to a reasonable degree of scientific
 13:56:39 16 certainty that this EDSA pattern in a vacuum can only
 13:56:46 17 correspond to a single mineral and only that mineral
 13:56:50 18 tremolite?
 13:56:50 19 MR. CIRSCH: Object to form.
 13:56:52 20 THE WITNESS: Within a reasonable degree
 13:56:56 21 of scientific certainty, if I looked at this
 13:56:57 22 mineral, I would say that looks like tremolite.
 13:56:59 23 Q. (By Mr. Chachkes) So I'm not asking about
 13:57:00 24 you. I'm asking -- this is a question about
 13:57:02 25 reproducibility, that if some other scientist looked

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13:57:06 1 at this, not you, okay, that are you testifying that
 13:57:12 2 within a reasonable degree of scientific certainty
 13:57:15 3 that this pattern can only correspond to tremolite?
 13:57:20 4 MR. CIRSCH: Object to form.
 13:57:21 5 THE WITNESS: I can't speculate what other
 13:57:22 6 scientists -- and they wouldn't be much of a
 13:57:25 7 scientist if they were going to look at this in
 13:57:28 8 a vacuum and then make some judgment on it
 13:57:31 9 without sitting at the TEM.
 13:57:32 10 If another very experienced scientist was
 13:57:34 11 sitting at a TEM looking at the counting rules
 13:57:39 12 and it's a regulated asbestos, he would most
 13:57:42 13 likely have some information about where it came
 13:57:45 14 from --
 13:57:45 15 Q. (By Mr. Chachkes) Okay. So the counting
 13:57:46 16 rules, how do they apply to Exhibit 12, the EDSA?
 13:57:49 17 A. Well, again, you cut me off. What I'm
 13:57:53 18 saying is I don't believe it would be a very -- that
 13:57:56 19 it's very scientific to sit in a vacuum and not know
 13:58:00 20 anything about anything and look at this, and how am
 13:58:04 21 I supposed to know what some other experienced
 13:58:06 22 scientist is going to say or do?
 13:58:07 23 Q. Okay. I'll represent to you I've shown
 13:58:10 24 this, what's in Exhibit 12, to a very experienced
 13:58:15 25 mineralogist who also does EDXA work, and that

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13:58:19 1 person's confirmed that this is not a unique pattern
13:58:22 2 for tremolite, that there are other minerals that
13:58:24 3 correspond.

13:58:25 4 Sitting here today, do you have anything
13:58:26 5 to provide me that disputes that?

13:58:28 6 MR. CIRSCH: Object to form. I mean, how
13:58:30 7 can he possibly testify to that?

13:58:36 8 MR. CHACHKES: I mean, limit the speaking
13:58:37 9 objections, please.

13:58:38 10 THE WITNESS: It's EDXA. This came off a
13:58:41 11 tremolite fiber bundle that we verified, that in
13:58:45 12 the matrix that this came out of, it's well
13:58:48 13 established that those type of amphiboles are
13:58:50 14 formed.

13:58:52 15 What some other expert or experienced
13:58:57 16 microscopist is saying that it's going to be
13:59:00 17 confused with some other minerals, I can't
13:59:02 18 comment on it. If you'd like to tell me what
13:59:05 19 those minerals are, I could certainly look and
13:59:08 20 see if there's -- (cell phone rings.)

13:59:10 21 Is that me? I'm sorry. It's not supposed
13:59:16 22 to be on. I apologize.

13:59:24 23 Q. (By Mr. Chachkes) What work have you done
13:59:28 24 to survey the world of minerals to determine what
13:59:36 25 other minerals other than regulated asbestos could

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14:01:00 1 at -- and I'm just talking about the EDXA now, I'm
14:01:03 2 not talking about counting or things that aren't the
14:01:06 3 EDXA -- I'm sorry. EDXA. Let me start that again.
14:01:11 4 I'm talking about just the EDXA now, not
14:01:15 5 talking about other methods of identifying what
14:01:17 6 you're looking at. Did you look at any textbook or
14:01:21 7 peer-reviewed literature to see what this pattern
14:01:27 8 could also -- in Exhibit 12 -- could also correspond
14:01:30 9 to?

14:01:30 10 MR. CIRSCH: Object to form.

14:01:31 11 THE WITNESS: It doesn't correspond -- and
14:01:32 12 you're --

14:01:33 13 Q. (By Mr. Chachkes) The question is what
14:01:34 14 you looked at.

14:01:34 15 A. Please don't interrupt.

14:01:37 16 MR. CIRSCH: Let him answer the question,
14:01:38 17 please.

14:01:39 18 THE WITNESS: You're trying to do this in
14:01:40 19 a vacuum. Here's just an EDS pattern, I'm not
14:01:42 20 going to give you any other information, I'm not
14:01:43 21 going to let you look at what kind of -- it's a
14:01:45 22 fibrous structure or it's a particulate. Not
14:01:46 23 going to let you look at the SAED patterns.

14:01:50 24 It's not following the procedure we've
14:01:52 25 used here for all these samples. So I can't

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13:59:40 1 have EDSA patterns that correspond to what I'm
13:59:46 2 looking at in Exhibit 12?

13:59:47 3 MR. CIRSCH: Object to form.

13:59:48 4 THE WITNESS: I've looked at all the
13:59:49 5 potential look-alikes, and again, you just can't
13:59:53 6 do an EDS pattern without looking at the
13:59:56 7 structure. Some -- and I've looked at every one
13:59:59 8 that Sanchez says that could be look-alikes, and
14:00:06 9 a number of them are not fibrous and a lot of
14:00:09 10 them have aluminum in it. So I'm not concerned
14:00:13 11 that this is anything but tremolite asbestos.

14:00:18 12 Q. (By Mr. Chachkes) Did you look at any
14:00:25 13 databases to compare this spectra to what the
14:00:28 14 databases say are the things that have similar EDSA
14:00:33 15 patterns?

14:00:33 16 MR. CIRSCH: Object to form.

14:00:34 17 THE WITNESS: No, I didn't look at any
14:00:37 18 databases. This was done in regards to the
14:00:39 19 typical TEM protocols for identifying asbestos.
14:00:42 20 I'm not aware of any other minerals with all the
14:00:46 21 characteristics of both being fibrous, meaning
14:00:48 22 the counting definition, the amphibole
14:00:54 23 diffraction pattern for the d-spacings. This is
14:00:57 24 not misidentified.

14:00:59 25 Q. (By Mr. Chachkes) Okay. Did you look

14:01:55 1 comment on something that I wouldn't do as an
14:01:58 2 expert coming in here just looking at an EDS
14:02:01 3 pattern with -- EDXA pattern without any other
14:02:04 4 information.

14:02:04 5 Q. (By Mr. Chachkes) Okay. So am I correct
14:02:06 6 that your answer is no, you did not look at a
14:02:09 7 textbook or peer-reviewed literature to determine
14:02:11 8 what this EDSA pattern could also correspond to other
14:02:15 9 than what you believe to be tremolite?

14:02:16 10 MR. CIRSCH: Object to form.

14:02:17 11 THE WITNESS: No. I wouldn't just take an
14:02:19 12 EDS pattern by itself and then run it to see
14:02:23 13 what other possible minerals in the world have
14:02:26 14 the same elements.

14:02:27 15 I would only be testifying here that this
14:02:29 16 is tremolite -- regulated tremolite asbestos
14:02:33 17 based on the entirety of the analysis that's
14:02:35 18 done for each of these fibers or bundles.

14:02:37 19 Q. (By Mr. Chachkes) Okay. Let's talk about
14:02:39 20 SAED for a moment. You did SAED pattern analysis?

14:02:43 21 A. Yes.

14:02:43 22 Q. Okay. Would you agree that the more
14:02:49 23 complete the SAED pattern an analyst obtains, the
14:02:52 24 more likely the analyst is to make an accurate
14:02:55 25 determination of the crystal structure?

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14:02:56	1	MR. CIRSCH: Object to form.	14:05:11	1	the -- if it is fibrous or not. That's all you
14:02:58	2	THE WITNESS: No.	14:05:16	2	need.
14:02:59	3	Q. (By Mr. Chachkes) Why not?	14:05:16	3	Q. (By Mr. Chachkes) Okay.
14:02:59	4	A. For tremolite you just need the	14:05:17	4	A. And that's all NVLAP requires.
14:03:03	5	d-spacings. For anthophyllite, you just need to --	14:05:21	5	Q. Okay. And that's expressly written in the
14:03:07	6	if it has anything close to the reflection or the	14:05:25	6	NVLA standard?
14:03:09	7	crystal orientation of fibrous talc, you just need to	14:05:28	7	A. I don't know if it's expressly written,
14:03:12	8	turn it to make sure that the amphibole pattern comes	14:05:30	8	but it's not required for any of the audits that we
14:03:16	9	up. You don't need to do anything more to adequately	14:05:33	9	have, zone axis patterns for tremolite or any
14:03:20	10	identify if it's anthophyllite versus fibrous talc or	14:05:37	10	regulated asbestos.
14:03:25	11	anthophyllite solid solution series.	14:05:37	11	Q. Okay. So your opinion is that good
14:03:28	12	Q. Okay. Is streaking in your SAED pattern	14:05:39	12	science is determined by whether something passes
14:03:32	13	something that can get in the way of an accurate	14:05:42	13	NVLA accreditation?
14:03:35	14	determination?	14:05:43	14	MR. CIRSCH: Object to form.
14:03:35	15	A. It depends on what type of asbestos it is.	14:05:44	15	THE WITNESS: It is good science. I don't
14:03:38	16	If you're seeing streaking and you have the right	14:05:48	16	know what good science mean. I mean, versus bad
14:03:41	17	chemistry and it's tubular, then it's chrysotile.	14:05:50	17	science?
14:03:44	18	But we don't see the streaking that's getting -- that	14:05:51	18	NVLAP is coming in to determine that if
14:03:47	19	you say is getting in the way to adequately look at	14:05:55	19	somebody sends you an air sample that you can
14:03:50	20	these diffraction patterns.	14:05:57	20	adequately identify, or bulk sample, identify
14:03:51	21	Q. If the dots on an SAED pattern are out of	14:06:01	21	the asbestos to the degree that you're not
14:03:56	22	focus, does that affect the accuracy in your	14:06:02	22	letting people walk into an environment where
14:03:59	23	determining the crystal structure?	14:06:04	23	they're getting exposed to asbestos.
14:03:59	24	A. Depends what you mean by out of focus. As	14:06:07	24	We go to the -- so that we perform the
14:04:01	25	long as you have the particular planes of dots, how	14:06:11	25	necessary analytical techniques for each of

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14:04:04	1	focused or out of focus it is sometimes doesn't matter. If it's way out of focus, yes, it would.	14:06:14	1	these methods to positively affirm or deny that
14:04:07	2	Q. Would you agree that it's important to --	14:06:19	2	there's any detectable asbestos present.
14:04:09	3	strike that.	14:06:21	3	Q. (By Mr. Chachkes) Does the NVLA have in
14:04:12	4	Would you agree that the further out you	14:06:23	4	it an example of d-spacing that corresponds to
14:04:13	5	have complete dots in the pattern and the more	14:06:27	5	tremolite?
14:04:21	6	focused the image it is, the easier it is for the	14:06:29	6	MR. CIRSCH: Object to the form.
14:04:23	7	analyst to study the crystal structure?	14:06:30	7	THE WITNESS: I believe so.
14:04:26	8	MR. CIRSCH: Object to form.	14:06:31	8	Q. (By Mr. Chachkes) Okay. And we'd find
14:04:28	9	THE WITNESS: It depends.	14:06:34	9	that on their website?
14:04:29	10	Q. (By Mr. Chachkes) What does it depend on?	14:06:35	10	MR. CIRSCH: Object to form.
14:04:32	11	A. Well, I have to get some examples and I	14:06:36	11	THE WITNESS: I think so.
14:04:34	12	can show you. You know, the patterns we have taken	14:06:37	12	Q. (By Mr. Chachkes) Okay. And then you
14:04:37	13	have been adequate for the analyst, plus the EDXA	14:06:38	13	said for anthophyllite, what do you need, again?
14:04:41	14	plus the fibrous nature to identify appropriately if	14:06:40	14	A. For us, anthophyllite, we just make sure
14:04:45	15	it's -- typically what we're seeing is either the	14:06:44	15	it's not fibrous talc, since we're looking at talc
14:04:49	16	tremolite solid solution series, more tremolite than	14:06:50	16	samples. And that the anthophyllite chemistry, the
14:04:52	17	winchite or richterite or actinolyte, and	14:06:55	17	anthophyllite solid solution chemistry is
14:04:56	18	anthophyllite solid solution series. We don't take	14:06:57	18	appropriate, what we typically see is, because we're
14:04:59	19	it any further than that.	14:07:00	19	using heavy density liquid primarily, I think, all
14:05:02	20	Q. So you testified that to determine whether	14:07:03	20	here, all with what I call iron-rich.
14:05:04	21	something is tremolite, you just need to know the	14:07:07	21	Q. My question is what SAED pattern
14:05:07	22	d-spacing; correct?	14:07:10	22	corresponds to anthophyllite?
14:05:08	23	MR. CIRSCH: Object to form.	14:07:12	23	MR. CIRSCH: Object to form.
14:05:09	24	THE WITNESS: And the EDXA as well as	14:07:13	24	THE WITNESS: Which one? There's 277 zone
	25	Atlanta Reporters, Inc. 866-344-0459 www.atlanta-reporters.com	14:07:16	25	axes. We look for a typical d-spacing of a

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14:07:19 1 different orientation for the two selected area
 14:07:23 2 electron diffraction patterns we take.
 14:07:26 3 Q. (By Mr. Chachkes) Okay. So you determine
 14:07:28 4 whether it's anthophyllite based on d-spacing when
 14:07:30 5 you're talking about SAED only?
 14:07:33 6 MR. CIRSCH: Object to form.
 14:07:33 7 THE WITNESS: D-spacing and a second
 14:07:36 8 pattern from a different crystalline orientation
 14:07:42 9 so that you can rule out fibrous talc.
 14:07:45 10 Q. (By Mr. Chachkes) Okay. So for
 14:07:48 11 tremolite, do you use two axes or just one?
 14:07:52 12 A. Just one. It's not required for tremolite
 14:07:56 13 since fibrous talc does not have any calcium in it.
 14:08:01 14 And what you're looking for in an EDS pattern is make
 14:08:05 15 sure there's no aluminum.
 14:08:07 16 Q. Okay. And for anthophyllite, you use --
 14:08:10 17 you need two axes is what you're saying?
 14:08:13 18 A. Two axes unless -- I think there's one in
 14:08:16 19 the entire bunch where we only did one.
 14:08:19 20 One axis if it doesn't have that
 14:08:22 21 pseudohexagonal pattern of talc. There's one
 14:08:26 22 reflection in talc -- I can't remember if it's the
 14:08:30 23 020 -- that some people say are similar. Doesn't
 14:08:34 24 look similar to me. But we just do two anyway for
 14:08:38 25 all these anthophyllite fibers and bundles.

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14:08:40 1 Q. Okay. For talc you use two axes to
 14:08:43 2 determine whether the SAED pattern corresponds to
 14:08:46 3 talc?
 14:08:47 4 A. No, we use two for anthophyllite solid
 14:08:51 5 solution series.
 14:08:52 6 Q. What about talc, how do you determine
 14:08:54 7 something under SAED is talc?
 14:08:56 8 A. Chemistry and one SAED pattern that has
 14:09:01 9 the hexagonal dot pattern.
 14:09:06 10 Q. Okay. So you use -- for the SAED portion
 14:09:10 11 of identifying something as talc, you use only one
 14:09:13 12 pattern; is that correct?
 14:09:15 13 A. That's correct.
 14:09:15 14 Q. Okay. If I took that one pattern that you
 14:09:21 15 use to identify talc under SAED, can that pattern
 14:09:25 16 only correspond to talc?
 14:09:29 17 MR. CIRSCH: Object to form.
 14:09:30 18 THE WITNESS: It can only correspond to
 14:09:32 19 talc as long as you have the chemistry to go
 14:09:35 20 along with it. Again, nothing here is done in a
 14:09:37 21 vacuum of just one and nothing else.
 14:09:39 22 Q. (By Mr. Chachkes) Okay. My question
 14:09:41 23 really isn't a vacuum. And I understand your
 14:09:43 24 qualification you think it's completely unfair, but I
 14:09:46 25 do want to hear what you have to say about this.

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14:09:48 1 If I have an isolated SAED pattern for
 14:09:53 2 talc in one axis and only that, no other information,
 14:10:00 3 does that uniquely identify talc?
 14:10:02 4 MR. CIRSCH: Object to form.
 14:10:03 5 THE WITNESS: I would not call it. I
 14:10:04 6 don't know what somebody else would do. I would
 14:10:07 7 want to see what we're looking at. Certainly if
 14:10:09 8 it's a talc plate versus chemistry -- but we're
 14:10:13 9 primarily interested in the fibrous talc.
 14:10:15 10 If you're an experienced TEM analyst, you
 14:10:20 11 wouldn't just do it -- to me, my opinion, you
 14:10:23 12 just wouldn't try in a vacuum without any
 14:10:25 13 information to look at a talc SAED and say
 14:10:29 14 that's talc.
 14:10:30 15 Q. (By Mr. Chachkes) Okay. So recall that
 14:10:31 16 when I asked you my question, I'm saying looking at
 14:10:34 17 SAED in a vacuum and then you went on to talk about a
 14:10:37 18 number of things that aren't SAED, like chemistry,
 14:10:41 19 fibers, plates. So this is a very specific question
 14:10:45 20 and yes or no. Does a one-axis SAED pattern for talc
 14:10:54 21 uniquely identify this as talc?
 14:10:58 22 MR. CIRSCH: Object to form. He's already
 14:10:59 23 answered the question.
 14:10:59 24 THE WITNESS: I would not call it talc
 14:11:01 25 just based on a one hexagonal pattern with no

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14:11:06 1 other information.
 14:11:06 2 Q. (By Mr. Chachkes) Okay.
 14:11:06 3 A. I would want to do -- and have the rest of
 14:11:08 4 the information that we talked about.
 14:11:10 5 I wouldn't do it. Maybe somebody else
 14:11:12 6 would. I can't comment on what other people might or
 14:11:14 7 might not do.
 14:11:15 8 Q. Okay. So for tremolite, you are saying
 14:11:18 9 you look at one axis as well; correct?
 14:11:20 10 A. Correct.
 14:11:21 11 Q. So same question. In a vacuum, all you
 14:11:25 12 have is the SAED pattern for one axis for something
 14:11:32 13 you otherwise would call tremolite. Does that
 14:11:34 14 uniquely and only identify tremolite?
 14:11:37 15 MR. CIRSCH: Object to form.
 14:11:38 16 THE WITNESS: If you were going to do
 14:11:42 17 that, and you were -- for whatever reason that
 14:11:46 18 here is an SAED pattern, there is nothing else,
 14:11:52 19 if it was a zone axis, then you'd have to get
 14:11:55 20 two zone axes, and now you're dealing with like
 14:11:58 21 no chemistry, no idea where the tremolite fiber
 14:12:01 22 came -- if it is tremolite.
 14:12:03 23 So I would not do it. I can't talk about
 14:12:05 24 what other people would do.
 14:12:06 25 Q. (By Mr. Chachkes) Okay. And indeed, a

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14:12:11 1 single axis SAED pattern for something that in your
14:12:18 2 report corresponds to tremolite can also correspond
14:12:23 3 to many other crystalline structures as well;
14:12:26 4 correct?

14:12:26 5 MR. CIRSCH: Object to form.

14:12:27 6 Q. (By Mr. Chachkes) Just in a vacuum.
14:12:29 7 Again, with all the qualifications that you don't
14:12:32 8 want to do it in a vacuum, but my question is in a
14:12:35 9 vacuum.

14:12:35 10 MR. CIRSCH: Object to form.

14:12:36 11 THE WITNESS: It would be a typical
14:12:37 12 amphibole diffraction pattern. You could say
14:12:39 13 it's an amphibole, but how far you're willing to
14:12:41 14 go on that on just that without any other
14:12:44 15 information, no chemistry, no structure
14:12:48 16 interface, no morphology, I would not call it
14:12:51 17 tremolite.

14:12:51 18 Q. (By Mr. Chachkes) Okay. So for
14:12:54 19 anthophyllite, where you have two axes and so like
14:13:00 20 two SAED patterns, in a vacuum, do those two patterns
14:13:06 21 sitting in front of you, no other information,
14:13:08 22 uniquely identify what you're looking at as
14:13:11 23 anthophyllite?

14:13:11 24 MR. CIRSCH: Object to form.

14:13:12 25 THE WITNESS: I don't know. Certainly

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14:14:31 1 THE WITNESS: I have not published any,
14:14:32 2 no.
14:14:32 3 Q. (By Mr. Chachkes) Have you taught SAED
14:14:34 4 pattern analysis?

14:14:35 5 A. Been a while, but yes.

14:14:37 6 Q. To whom?

14:14:38 7 A. Graduate students back in the day when I
14:14:41 8 was visiting assistant professor.

14:14:42 9 Q. How many orientations do you need to

14:14:47 10 uniquely identify a mineral with SAED and only SAED?

14:14:52 11 A. A minimum of two, maybe three.

14:14:54 12 Q. Measurements on an SAED are taken in
14:15:01 13 angstroms; correct?

14:15:02 14 A. Yes, sir, an angle, angle between -- you

14:15:07 15 identify, say, the 002, then you have to get to

14:15:10 16 another orientation, say, the 010 or the minus 020,
14:15:17 17 and then take the angles and do the measurements or
14:15:20 18 use CrystalMaker.

14:15:21 19 Q. Okay. CrystalMaker software that helps
14:15:24 20 you analyze?

14:15:24 21 A. Well, as long as it has the appropriate
14:15:26 22 standards in it, you could.

14:15:28 23 Q. Do you use CrystalMaker?

14:15:30 24 A. We have CrystalMaker. But, no, it's not
14:15:32 25 required for what we do.

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14:13:13 1 would rule out talc with the two patterns.
14:13:16 2 If I wasn't told that this came out of a
14:13:18 3 cosmetic talc bulk sample and wasn't allowed to
14:13:21 4 look at any chemistry, if I wasn't allowed to do
14:13:24 5 any EDXA and morphology, I probably would not
14:13:31 6 spend the time contemplating what that was.

14:13:33 7 Q. (By Mr. Chachkes) Okay. You agree that
14:13:36 8 the same particle can have different SAED patterns at
14:13:42 9 different orientations; right?

14:13:43 10 A. Yes.

14:13:43 11 Q. And an SAED analyst can take measurements
14:13:49 12 of the crystals on various axes; correct?

14:13:53 13 A. Yes. You can get zone axis, and depending
14:13:56 14 on the orientation of the fiber or bundle, you may
14:13:59 15 get two -- tough to get three because of your limited
14:14:04 16 mobility of tilting the fiber; you have to double
14:14:08 17 tilt it. You could probably get three if one wanted.

14:14:11 18 Q. Okay. Are you an expert in SAED pattern
14:14:17 19 analysis?

14:14:18 20 A. I probably know more than the average
14:14:20 21 layperson.

14:14:21 22 Q. Okay. But are you an expert? Are you
14:14:24 23 somebody, for example, who maybe published any
14:14:27 24 articles on SAED pattern analysis?

14:14:30 25 MR. CIRSCH: Object to form.

14:15:33 1 Q. Okay. If you put what you otherwise
14:15:40 2 identified as an SAED pattern for tremolite into
14:15:44 3 CrystalMaker without the other end pop, the
14:15:47 4 identification, this is tremolite?

14:15:49 5 MR. CIRSCH: Object to form.

14:15:50 6 THE WITNESS: If you had the appropriate
14:15:51 7 zone axis and nothing else, it might.

14:15:54 8 Q. (By Mr. Chachkes) You don't know one way
14:15:55 9 or the other? Have you ever done that?

14:15:57 10 A. Have we used CrystalMaker? We have used
14:15:59 11 it in the past, but we don't use it for this
14:16:02 12 analysis.

14:16:03 13 Q. So have you done CrystalMaker on a single
14:16:06 14 axis? Have you used CrystalMaker for a single axis
14:16:16 15 SAED pattern?

14:16:16 16 MR. CIRSCH: Object to form.

14:16:17 17 THE WITNESS: I don't recall doing that.

14:16:18 18 Q. (By Mr. Chachkes) Okay. When I talked
14:16:20 19 about measurements being taken in angstroms, that's
14:16:22 20 the measurement between the dots; right?

14:16:23 21 A. Yes.

14:16:24 22 Q. And that's what we're calling d-space?

14:16:27 23 A. D-space is between the planes. That's the
14:16:28 24 measurement we do now.

14:16:30 25 Q. What's the difference between what I said

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14:16:32 1 and what you said?

14:16:33 2 A. Well, you can get to the different planes,

14:16:35 3 but you can also get to -- the d-spacing is the

14:16:38 4 layers of atoms on top of each other.

14:16:40 5 Q. Okay. Can you describe how your analyst

14:16:50 6 calibrates the SAED apparatus?

14:16:55 7 A. They do.

14:16:55 8 Q. No, I'm sorry, can you describe how they

14:16:57 9 do it?

14:16:57 10 A. Well, they get the working distance, and

14:16:59 11 typically they're using a gold standard for the rings

14:17:02 12 and the working distance so they can do that

14:17:05 13 calibration.

14:17:05 14 Q. When you say a gold standard, what do you

14:17:07 15 mean by that?

14:17:07 16 A. Well, you take something that's fibrous

14:17:11 17 and you put a gold film on the top so that you get

14:17:14 18 the outer rings of the gold, which is a standard

14:17:16 19 measurement, and then the working distance so you can

14:17:18 20 calibrate.

14:17:19 21 Q. Literally a standard made of gold; is that

14:17:22 22 what you're saying?

14:17:23 23 A. Yes. Well, it's a very small piece of

14:17:26 24 gold wire --

25 Q. Okay.

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14:17:26 1 A. -- that you sputter, so you're not using a

14:17:28 2 lot.

14:17:29 3 Q. How often do your analysts calibrate the

14:17:33 4 SAED apparatus?

14:17:35 5 A. Whatever is required for our NVLAP

14:17:37 6 accreditation.

14:17:38 7 Q. Do you have any -- sitting here today, do

14:17:40 8 you know what that is?

14:17:40 9 A. No.

14:17:41 10 Q. Is that in your report?

14:17:43 11 A. No, sir.

14:17:44 12 Q. Okay. So do your analysts tilt the stage

14:17:56 13 on the TEM to direct the electrons at a certain face

14:18:00 14 of the crystal?

14:18:01 15 MR. CIRSCH: Object to form.

14:18:02 16 THE WITNESS: The only fibrous material

14:18:06 17 that we tilt the stage is when we suspect the

14:18:10 18 anthophyllite solid solution series, where we

14:18:13 19 rotate it to make sure that the hexagonal

14:18:19 20 plane -- it's not even the hexagonal plane.

14:18:23 21 It's a -- I always forget. It's either an 020

14:18:26 22 or an 002 reflection off the talc, fibrous talc

14:18:31 23 orientation.

14:18:37 24 Q. (By Mr. Chachkes) Okay. Can you point me

14:18:37 25 to published peer-reviewed literature where that's an

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14:18:37 1 appropriate way to identify that mineral?

14:18:39 2 MR. CIRSCH: Object to form.

14:18:40 3 THE WITNESS: I can't. I mean, as I sit

14:18:46 4 here, I don't recall.

14:18:47 5 Q. (By Mr. Chachkes) Okay. Are the TEMs in

14:18:51 6 your lab equipped with -- I'm going to butcher the --

14:18:56 7 is it goniometer?

14:18:57 8 A. Goniometer.

14:18:58 9 Q. Okay. Are the TEMs in your lab equipped

14:19:00 10 with goniometers to rotate particles?

14:19:03 11 A. Yes. We have a double-tilt holder that we

14:19:05 12 use if we're going to do zone axis. And we have a

14:19:08 13 goniometer that can rotate the sample I think up to

14:19:15 14 30 degrees, so it's usually at zero tilt.

14:19:21 15 Q. Okay. In your report I don't see any SAED

14:19:25 16 patterns done for a single subject crystal in three

14:19:29 17 different axes. That's correct; right?

14:19:31 18 A. That is correct, you will not find that.

14:19:32 19 Q. And you didn't do that?

14:19:33 20 A. No.

14:19:34 21 Q. Okay. Did your analyst document every

14:19:40 22 instance in the report where they used multiple SAED

14:19:44 23 patterns?

14:19:45 24 A. I hope so.

14:19:52 25 MR. CHACHKES: Maybe we should -- let's go

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14:19:54 1 to this one.

14:20:30 2 (Defendants' Exhibit 15 was marked for

14:20:32 3 identification.)

14:20:32 4 Q. (By Mr. Chachkes) Okay. Marked as

14:20:34 5 Exhibit 15, you recognize this as a three-axis SAED

14:20:38 6 for tremolite; right?

14:20:39 7 A. I know that's what it states.

14:20:40 8 Q. In your opinion, is that different? Is

14:20:43 9 this not a three-axis?

14:20:46 10 A. Well, it says it's -- you know the 100,

14:20:49 11 the 010, and the 001, that would be three crystal

14:20:53 12 orientations by the Miller indices. Now, if that's

14:20:56 13 what we're looking at here or not, I would have to go

14:20:59 14 measure it, get the camera constant, et cetera.

14:21:03 15 So I'm not here to dispute it, but I can't

14:21:06 16 validate that's what it is.

14:21:08 17 Q. Is there anything -- looking at this right

14:21:09 18 now, is there any reason you have to dispute that

14:21:11 19 indeed this is an accurate three-axis SAED for

14:21:16 20 tremolite?

14:21:17 21 MR. CIRSCH: Object to form.

14:21:18 22 THE WITNESS: I have no reason to dispute

14:21:19 23 it. I have no reason to accept it.

14:21:24 24 Q. (By Mr. Chachkes) Okay.

14:21:25 25 A. If that's what you're saying it is, then

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14:21:22	1 that's what you're saying.	14:24:12	1 linguistically. I'm going to do that again.
14:21:23	2 Q. Okay. You see that the pattern is	14:24:13	2 A. That's fine.
14:21:26	3 different for each of the three axes?	14:24:13	3 Q. If I want to figure out which sample a
14:21:27	4 A. Well, you have three different crystal	14:24:17	4 particular verification page refers to, that sample
14:21:29	5 orientations.	14:24:20	5 is written on the page; correct?
14:21:30	6 Q. Okay.	14:24:21	6 A. Yeah, each sample number is on here.
14:21:31	7 A. Of course it's going to be different.	14:24:24	7 Q. Okay.
14:21:32	8 Q. Okay. So you predicted my next question,	14:24:28	8 A. You know, M68503-001. So you would look
14:21:36	9 which is in your experience, three different crystal	14:24:36	9 for '60, '70s, '80s, wherever it is, and then the
14:21:38	10 orientations for SAED for the same crystal may or	14:24:38	10 second number, -001, would be the number 1 or the
14:21:42	11 probably will produce three different patterns;	14:24:42	11 first asbestos structure or bundle that is the
	12 correct?	14:24:42	12 diffraction pattern is being taken.
14:21:44	13 A. That is correct.	14:24:44	Q. Sorry. And you went a little quick for
14:21:44	14 Q. Okay. For tremolite it certainly will	14:24:47	me, and I apologize --
14:21:48	15 produce three different patterns?	14:24:49	A. That's all right. So you see the number
14:21:50	16 A. For most of your fibrous crystals where	14:24:50	there, M68503 --
14:21:54	17 you can rotate it, yes.	14:24:51	Q. Okay. So I see that as MAS job number.
14:21:56	18 Q. Including anthophyllite and fibrous talc?	14:24:53	That's where you're pointing?
14:22:01	19 MR. CIRSCH: Object to form.	14:24:54	A. Right.
14:22:02	20 THE WITNESS: Including -- no. Fibrous	14:24:55	Q. And can you actually, just so we're on the
14:22:02	talc, not. You can rotate it. You're only	14:24:55	same page, literally, can you go to the first
14:22:05	going to get one pattern. That's why if you do	14:25:00	verification?
14:22:09	23 see the reflection that some people will argue	14:25:00	Okay. So you've got the MAS job number,
14:22:12	24 looks a little bit like what anthophyllite can	14:25:02	and I'm looking at the number that begins M68
14:22:15	do, you rotate it, and that never changes.	14:25:05	something, something, something. Okay. How does
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14:22:51 **1** MR. CHACHKES: Okay. Let's mark as 16.
 14:22:53 **2** (Defendants' Exhibit 16 was marked for
 14:23:07 **3** identification.)
 14:23:07 **4** Q. (By Mr. Chachkes) Okay. So do you
 14:23:09 **5** recognize what's been marked as Exhibit 16?
 14:23:10 **6** **A. Yes, Verification of 0-Degree Amphibole**
 14:23:13 **7** **Diffraction Patterns, these are our documents.**
 14:23:16 **8** Q. Okay. This was produced to us, I think,
 14:23:20 **9** Saturday. Do you recall giving this to plaintiffs'
 14:23:23 **10** counsel recently --
 14:23:24 **11** **A. I do.**
 14:23:24 **12** Q. -- to produce?
 14:23:27 **13** Okay. What is it? Can you just -- on a
 14:23:28 **14** high level, what am I looking at?
 14:23:31 **15** **A. High level, we're looking at the**
 14:23:32 **16** **d-spacings of, most likely, tremolite and**
 14:23:40 **17** **anthophyllite.**
 14:23:40 **18** Q. And this corresponds to a number of
 14:23:49 **19** samples that appear in your report; correct?

14:23:51 **20** **A. It does.**
 14:23:51 **21** Q. Okay. And to figure out which page
 14:23:56 **22** relates to which diffraction pattern, I can look on
 14:24:01 **23** that page and it's written in there somewhere; right?
 14:24:06 **24** **A. You'll have to -- I'm sorry.**
 14:24:07 **25** Q. I think I might have messed that up

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14:25:06 **1** that tell me what sample that refers to?
 14:25:09 **2** **A. Well, our job number would be M68503. If**
 14:25:14 **3** **you go to the various '60s, '70s, and '80s, you'll**
 14:25:17 **4** **see that number.**
 14:25:18 **5** Q. Sorry. Let's pause. '60s, '70s, and
 14:25:21 **6** '80s, you're referring to year --
 14:25:22 **7** **A. The decades.**
 14:25:23 **8** Q. Okay.
 14:25:23 **9** **A. And so then you look for -- if it has**
 14:25:26 **10** **M68503 on there, you look for the first dash, 001.**
 14:25:31 **11** Q. And what's the first dash refer to?
 14:25:33 **12** **A. Right. That will tell you that that is**
 14:25:35 **13** **the actual sample number. Then you can go -- it will**
 14:25:39 **14** **tell you what tab to look under.**
 14:25:41 **15** **And then the second sample number is 001,**
 14:25:44 **16** **means that is the first asbestos, in this case,**
 14:25:49 **17** **anthophyllite solid solution series. It's the very**
 14:25:53 **18** **first structure up. So you can go then to the data**
 14:25:56 **19** **there and find that very first diffraction pattern.**
 14:25:59 **20** Q. Okay. But when you say the data there, is
 14:26:02 **21** that data you're referring to in Exhibit 16?
 14:26:04 **22** **A. No, the data that is in the actual data**
 14:26:07 **23** **notebooks.**
 14:26:07 **24** Q. Got it. And your ability to identify
 14:26:12 **25** '60s, '70s, '80s decades, is that something inherent

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14:26:17 1 in the job number? Is that like coded in there? How
 14:26:19 2 did you --
 14:26:19 3 **A. That's why I used all of them.**
 14:26:20 4 Q. Oh, okay.
 14:26:21 5 A. **If you'll give me one, I can -- you know,**
 14:26:22 6 **I can probably find it. I didn't bring those along.**
 14:26:24 7 **They're getting too big.**
 14:26:26 8 Q. Okay. I see on this page, date verified
 14:26:31 9 11/19/18; do you see that?
 14:26:33 10 A. **Yes.**
 14:26:35 11 Q. What does that mean? What was verified?
 14:26:37 12 A. **That means that's the date that the data**
 14:26:39 13 **was run for this particular program that did this**
 14:26:44 14 **analysis.**
 14:26:45 15 Q. Is that the date of the SAED as well?
 14:26:48 16 A. **No. If you go over to the right-hand**
 14:26:51 17 **side, it says date of photo --**
 14:26:53 18 Q. Okay.
 14:26:54 19 A. **-- 10/29/2018, and the SAED pattern should**
 14:26:57 20 **have that date on it.**
 14:26:58 21 Q. Got it. And when you say the data was run
 14:27:02 22 on November 19, 2018, was it put into some computer
 14:27:07 23 program, or someone did a hand d-spacing? How was
 14:27:11 24 that --
 14:27:12 25 A. **No. The information is put in, it's all**
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14:28:19 1 Q. And is the reason that zone axis
 14:28:22 2 information on the lower left is not put in there is
 14:28:24 3 because you really only ran one?
 14:28:26 4 A. **Well, you can get a zone axis -- if you**
 14:28:28 5 **happen to hit a zone axis, it will -- you can**
 14:28:34 6 **calculate through that. The second anthophyllite**
 14:28:36 7 **pattern for this one fiber on the next page has a**
 14:28:41 8 **zone axis that said it was near the 101.**
 14:28:43 9 Q. Got it. So you're saying is that the
 14:28:48 10 first verification page that I'm looking at is one
 14:28:51 11 zone axis, and the second page is another zone axis
 14:28:54 12 for the same anthophyllite particle?
 14:28:55 13 A. **No. Not quite.**
 14:28:57 14 Q. Okay.
 14:28:57 15 A. **The first one is just d-spacing, the**
 14:28:59 16 **second one is just d-spacing. In this particular**
 14:29:02 17 **case when they went to the second orientation, they**
 14:29:05 18 **got very close to the 101 zone axis.**
 14:29:08 19 Q. Okay. So there's two orientations on
 14:29:11 20 these page 1 and page 2, one is one orientation, the
 14:29:14 21 second is another orientation?
 14:29:16 22 A. **Correct, for the same fiber/bundle.**
 14:29:18 23 Q. Got it. We've looked through this, and
 14:29:22 24 we've totaled 35 samples, which is less than the 72
 14:29:28 25 samples in your report. Is that consistent with what
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14:27:14 1 **digital, and it does the calculation. When you put**
 14:27:17 2 **in the, you know, the distance, the camera constant,**
 14:27:22 3 **and then it will calculate the d-spacing.**
 14:27:24 4 Q. I'm sorry, when you say it, there's a
 14:27:26 5 software that you're using?
 14:27:28 6 A. **Yes.**
 14:27:28 7 Q. And does the software kind of just read
 14:27:30 8 the image? You don't have to actually calculate the
 14:27:32 9 d-spacing by hand?
 14:27:33 10 A. **Well, you have to put in the information**
 14:27:35 11 **on the camera constant, but then it will read the**
 14:27:39 12 **pattern and calculate what the d-spacing is.**
 14:27:42 13 Q. Got it. And do you know the name of that
 14:27:44 14 software?
 14:27:45 15 A. **I do not.**
 14:27:46 16 Q. Is that on your computer?
 14:27:48 17 A. **It's on the TEM computers.**
 14:27:52 18 Q. Okay. The numbers that it generates for
 14:27:57 19 d-spacing, is that fully disclosed here on this page?
 14:28:03 20 A. **Yes.**
 14:28:04 21 Q. Okay.
 14:28:05 22 A. **Over here on the calculated spacing of**
 14:28:07 23 **5.23, and if you go to anthophyllite, the d-spacing**
 14:28:11 24 **is in that range of 5.02 to 5.54 on the range, plus**
 14:28:17 25 **or minus 5 percent.**
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14:29:31 1 you believe this to be?
 14:29:34 2 MR. CIRSCH: Object to form.
 14:29:35 3 THE WITNESS: Well, a number of samples
 14:29:38 4 were negative. There would be no zone axis
 14:29:42 5 pattern.
 14:29:42 6 A number of the samples would not have
 14:29:45 7 been run through because we were doing
 14:29:46 8 verification of Lee Poye's samples, and there's
 14:29:51 9 a lot of different samples. I believe we have
 14:29:53 10 produced all the ones that we have taken.
 14:29:55 11 Q. (By Mr. Chachkes) Okay. There were 50
 14:29:57 12 positives amongst the 72 samples you looked at, and
 14:30:00 13 yet only 35 samples for which we have the diffraction
 14:30:08 14 verifications. Am I incorrect there?
 14:30:11 15 MR. CIRSCH: Object to form.
 14:30:13 16 THE WITNESS: Well, a number of positive
 14:30:15 17 samples there was no TEM because it was
 14:30:19 18 negative. The Lee Poye verification on his, he
 14:30:25 19 had six negatives where we found it positive by
 14:30:29 20 PLM. And then an extra sample. I'll have to
 14:30:35 21 add it all up now. I believe you have
 14:30:38 22 everything if we went through and did the math.
 14:30:40 23 Q. (By Mr. Chachkes) Okay. You had
 14:30:41 24 personally in your lab, MAS, 50 positives; right?
 14:30:46 25 MR. CIRSCH: Object to form.
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14:30:47 1 Q. (By Mr. Chachkes) Let's strike that. All
14:30:57 2 right.
14:30:57 3 So the top of your own supplemental report
14:31:00 4 reads that -- I'm going to read a sentence from your
14:31:05 5 report, This new information changed the total number
14:31:07 6 of containers/samples analyzed from 71 to 72 and the
14:31:11 7 total positive samples from 49 to 50.
14:31:14 8 That's accurate; right?
14:31:15 9 A. Yes.
14:31:15 10 Q. Okay. If there are 50 positives -- let's
14:31:19 11 only talk about the positives. If there are 50
14:31:21 12 positive, why only have verifications for 35?
14:31:24 13 A. Well, off the top of my head, five of the
14:31:29 14 positives out of six is from Lee Poye's analysis. We
14:31:34 15 did not verify his negative samples. Those became
14:31:38 16 positive because of the Blount PLM and the ISO PLM.
14:31:43 17 Also, the two samples in Lee Poye where we could not
14:31:47 18 verify the nine out of 11, they became positive by
14:31:52 19 PLM. So now we're up to seven.
14:31:55 20 Q. Of the 15 we're missing; right?
14:31:58 21 A. Not missing any.
14:31:59 22 Q. Okay.
14:31:59 23 A. Now there's a number of samples through
14:32:02 24 here where the PLM and/or ISO was positive and the
14:32:05 25 TEM was not. If the TEM is negative, there's no

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14:33:08 1 MR. CHACHKES: Well, I interpret "I
14:33:09 2 understood" differently than you do.
14:33:11 3 Q. (By Mr. Chachkes) Was a diffraction --
14:33:12 4 okay. Skip that.
14:33:14 5 Now, what are these ranges up here at the
14:33:20 6 top? I see like a table. What's that? The same
14:33:25 7 table appears to be reproduced in every single
14:33:27 8 verification page; am I right?
14:33:28 9 A. Right. That gives you the amphibole
14:33:30 10 types, the page number it's on, card number for the
14:33:33 11 mineral pallet diffraction file, and it gives the
14:33:37 12 calculated spacings in the range.
14:33:39 13 So these d-spacings are all tied back to a
14:33:44 14 standard that every lab should have for these
14:33:50 15 particular type of regulated asbestos structures.
14:33:53 16 Q. Okay. The page number refers to a page of
14:33:57 17 what, in the table?
14:33:59 18 A. Page of the Mineral Powder Diffraction
14:34:02 19 File Data for that particular mineral.
14:34:03 20 So grunerite will be found on page 449.
14:34:07 21 It will be card number 31-631. And on that card
14:34:11 22 number it will give you the calculated d-spacings for
14:34:15 23 that particular mineral.
14:34:16 24 Q. Okay. So it's a page within the Mineral
14:34:21 25 Powder Diffraction File, and then in that page is
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14:32:09 1 SAED. I think that will get you to your number.
14:32:13 2 Q. Got it.
14:32:15 3 So if there was a positive under TEM in
14:32:19 4 the MAS laboratory, I've got the verification here in
14:32:23 5 Exhibit 16?
14:32:26 6 A. You are supposed to.
14:32:31 7 MS. O'DELL: Let me just insert an
14:32:31 8 objection. There were a number of I think six
14:32:33 9 files that were produced very similar to
14:32:35 10 Exhibit 16, so they're not all contained in that
14:32:37 11 exhibit and --
14:32:44 12 MR. CHACHKES: And I agree --
14:32:44 13 MS. O'DELL: The record shouldn't reflect
14:32:45 14 that they are. There are five more documents
14:32:48 15 that are very similar to Exhibit 16 --
14:32:51 16 MR. CHACHKES: Yeah.
14:32:51 17 Q. (By Mr. Chachkes) And I apologize.
14:32:51 18 Everything I said was correct, except you have to
14:32:54 19 take the six files that you gave me, put them
14:32:57 20 together, and we only have 35.
14:32:58 21 A. I understood that.
14:32:59 22 MR. CHACHKES: Okay. So as long as the
14:33:01 23 witness understood, I think we're good.
14:33:03 24 MS. O'DELL: That's not true, but I'm glad
14:33:06 25 we clarified.

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14:34:23 1 something called a card. I imagine that's like a
14:34:25 2 little box?
14:34:26 3 A. Correct. And it will give you all the
14:34:30 4 d-spacing information that's published here.
14:34:32 5 Q. Okay. And the range, I see in the last
14:34:37 6 column on the right, that's the margin of error?
14:34:41 7 A. Correct.
14:34:42 8 Q. Now, if I'm reading this correctly, U4, on
14:34:47 9 this first page of the verification, you calculated a
14:34:50 10 spacing of 5.23; correct?
14:34:53 11 A. Correct.
14:34:54 12 Q. And that falls within every single
14:34:57 13 amphibole types range in that chart?
14:35:01 14 A. That's correct.
14:35:01 15 Q. How is it you identified this as
14:35:08 16 anthophyllite when it falls within five different
14:35:13 17 d-spacing ranges?
14:35:15 18 A. Do I get to use the other data that's
14:35:17 19 generated, or is this one of those in a vacuum type
14:35:19 20 questions?
14:35:20 21 Q. Let's say in a vacuum. In a vacuum.
14:35:22 22 MR. CIRSCH: Object to form.
14:35:23 23 THE WITNESS: I wouldn't -- if I just had
14:35:25 24 the d-spacing without any information, I
14:35:28 25 wouldn't make that call. I wouldn't say that it

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14:35:30 1 was anthophyllite. I would say it is consistent
14:35:32 2 with the typical amphibole d-spacing.

14:35:34 3 Q. (By Mr. Chachkes) Okay. What other
14:35:36 4 amphibole in the Mineral Powder Diffraction File have
14:35:44 5 d-spacing ranges that span 5.23?

14:35:48 6 A. **Most of your amphibole minerals, both**
14:35:52 7 **monoclinic and orthorhombic, will have d-spacings in**
14:35:56 8 **this range.**

14:35:57 9 Q. What about nonamphiboles, are there
14:36:01 10 nonamphibole crystals that have d-spacings that the
14:36:03 11 range covers 5.23?

14:36:05 12 A. **I don't believe so.**

14:36:06 13 Q. The --

14:36:31 14 A. **Are we done with this one?**

14:36:32 15 Q. For now, yes.

14:36:34 16 Let's go to another exhibit. That's going
14:36:37 17 to be -- let her mark it up.

14:36:41 18 A. **Oh. Sorry.**

14:36:43 19 MR. CHACHKES: That's going to be 17.
14:36:43 20 (Defendants' Exhibit 17 was marked for
14:36:59 21 identification.)

14:36:59 22 Q. (By Mr. Chachkes) Is this the same sort
14:37:02 23 of document as 16? Is this one of the --

14:37:04 24 A. **Yes.**

14:37:04 25 Q. Okay. At the top, I see that for your

14:38:39 1 software?

14:38:39 2 A. It's measured off the image that's been

14:38:43 3 calibrated.

14:38:43 4 Q. Okay. It's measured off the image --

14:38:45 5 A. Of the diffraction -- diffraction pattern

14:38:48 6 when you run the program, yes.

14:38:48 7 Q. Okay. So it's measured by the program,

14:38:50 8 not somebody -- a human being with a ruler?

14:38:51 9 A. Not anymore.

14:38:53 10 Q. Okay. Used to be manual?

14:38:54 11 A. Old days, yes.

14:39:03 12 Q. Okay.

14:39:03 13 A. When you actually took a negative and

14:39:07 14 every TEM lab had a dark room. And thank goodness

14:39:03 15 those days are over.

14:39:04 16 Q. Can you provide me a reference in the

14:39:07 17 scientific literature that permits the identification

14:39:16 18 of an asbestos type strictly by an EDS -- sorry --

14:39:25 19 SAED pattern? Strike that. Let me ask that better.

14:39:28 20 Can you provide me a reference in the

14:39:29 21 published literature -- in the scientific literature

14:39:31 22 that sanctions identifying an asbestos simply by a

14:39:39 23 single axis SAED pattern?

14:39:42 24 A. I think we already talked about that. I'm

14:39:44 25 not sure any scientific literature would say if

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14:37:23 1 SAED analysis you have an equation to determine
14:37:27 2 spacing; do you see that?

14:37:28 3 A. **We have the camera constant divided by the**
14:37:34 4 **measured distance, yes.**

14:37:35 5 Q. Okay. And in your -- your methodology
14:37:43 6 determined the spacing by dividing the camera
14:37:45 7 constant by the measured distance; is that correct?

14:37:48 8 A. **Correct.**

14:37:49 9 Q. And why does MAS use this formula?

14:37:52 10 A. **That's the standard formula. You can --**
14:37:57 11 **the pixels is part of the computer program where you**
14:38:01 12 **could -- in the old days you'd actually measure it.**

14:38:03 13 Q. Can you provide a reference in the
14:38:05 14 scientific literature that reflects this equation?

14:38:08 15 A. **CrystalMaker has it.**

14:38:12 16 Q. CrystalMaker software; right?

14:38:15 17 A. **Software. Yes, somewhere I can find it**
14:38:17 18 **from the old days the formula for this.**

14:38:20 19 Q. Okay. You didn't cite anything in your
14:38:22 20 paper, correct, in your reports; correct?

14:38:25 21 A. **No, because it's a standard method that**
14:38:27 22 **all TEM labs do that do this, so.**

14:38:30 23 Q. The manual -- I'm sorry, the measured
14:38:34 24 distance than the denominator, that's manually
14:38:38 25 measured, or is that measured automatically by

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14:39:47 1 **you're only handed the information from one zone axis**
14:39:51 2 **diffraction pattern without the rest of the**
14:39:55 3 **information -- if you have a good zone axis and it**
14:40:01 4 **matches, you may be able to do the calculation.**
14:40:06 5 **So one zone axis -- you might be able to**
14:40:11 6 **do that if you're looking at between two different**
14:40:14 7 **minerals, say, a monoclinic versus an orthorhombic.**
14:40:19 8 **If you have no information whatsoever, I**
14:40:25 9 **don't know. I don't know if you could do it with**
14:40:27 10 **just one. I'd have to see.**
14:40:28 11 Q. Okay. The Mineral Powder Diffraction File
14:40:32 12 Data, is that a book I can go out in the library and
14:40:36 13 get?
14:40:37 14 MR. CIRSCH: Object to form.
14:40:38 15 THE WITNESS: I imagine, if it's only an
14:40:39 16 engineering library or a library at a
14:40:42 17 university. You can order it online.
14:40:44 18 Q. (By Mr. Chachkes) Okay. It's generated
14:40:46 19 by somebody outside of MAS?
14:40:48 20 A. **No, this is not an MAS book. This is the**
14:40:54 21 **Mineral Powder Diffraction File Data Book. There's**
14:40:55 22 **an international standard for these types of cards**
14:40:59 23 **for the crystalline structure information.**
14:41:01 24 Q. Okay. What's the d-spacing for talc?
14:41:15 25 A. **I don't know.**

14:41:17 1 Q. Is the d-spacing for talc within the
14:41:22 2 ranges we see here for -- in your chart for regulated
14:41:26 3 asbestos?

14:41:26 4 **A. It's been a while since I've calculated
14:41:30 5 it, so I'd have to look that up.**

14:41:33 6 Q. Why do you only have amphiboles in your
14:41:41 7 reference chart?

14:41:46 8 MR. CIRSCH: Object to form.

14:41:47 9 THE WITNESS: Because this is the 0-degree
14:41:50 10 amphibole diffraction pattern table.

14:41:53 11 Q. (By Mr. Chachkes) So are you assuming
14:41:56 12 going into looking at the SAED pattern that you're
14:41:59 13 looking at an amphibole, or you're saying the
14:42:02 14 amphibole patterns that you're looking at could
14:42:04 15 only -- the patterns you're looking at could only be
14:42:06 16 amphiboles?

14:42:07 17 **A. There's no serpentine materials in here.
14:42:12 18 We've never measured chrysotile -- ever detected
14:42:15 19 chrysotile asbestos in any of the TEM analysis
14:42:17 20 because of the heavy liquid density separation.**

14:42:21 21 **And we don't go in blind or in a vacuum
14:42:24 22 when we do this. The chrysotile diffraction patterns
14:42:29 23 are very unique; the morphology is very unique. So
14:42:33 24 when we have amphiboles, we have a different chart.**

14:42:36 25 Q. And again -- strike that.

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14:42:44 1 I think I already asked this question, I
14:42:48 2 apologize if I'm asking it twice, but there are
14:42:51 3 nonamphiboles that have d-spacing within the ranges
14:42:53 4 we see in this chart, that is, crystals that are
14:43:00 5 nonamphiboles?

14:43:00 6 **A. Most amphiboles will have d-spacings in
14:43:03 7 this range.**

14:43:04 8 Q. My question is are there crystals that
14:43:08 9 aren't amphiboles and aren't serpentine that have
14:43:11 10 d-spacings in this range?

14:43:13 11 MR. CIRSCH: Object to form.

14:43:14 12 THE WITNESS: Nonamphiboles, not that I'm
14:43:16 13 aware of.

14:43:16 14 Q. (By Mr. Chachkes) For example, are there
14:43:17 15 any phyllosilicates that have d-spacing in these
14:43:21 16 ranges?

14:43:21 17 **A. I don't believe so.**

14:43:22 18 Q. Okay. You're stating to within a degree
14:43:25 19 of scientific certainty there aren't any --

14:43:28 20 MR. CIRSCH: Object --

14:43:28 21 THE WITNESS: When I say I don't believe
14:43:29 22 so, I don't think I hold that within a
14:43:32 23 reasonable degree of scientific certainty.

14:43:33 24 Again, I'm not looking at this in a
14:43:36 25 vacuum. If you have the amphibole d-spacing,

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14:43:39 1 you have the appropriate chemistry. In these
14:43:41 2 cases they did zone axis for these particular
14:43:44 3 samples, for these two samples, so zone axis for
14:43:52 4 1 and 2.

14:43:55 5 So, you know, I don't know how many
14:43:58 6 nonamphiboles are out there, but there's nothing
14:44:02 7 that I'm aware of if you're looking at all the
14:44:04 8 appropriate information and not looking at this
14:44:07 9 in a vacuum. None of this has ever -- you've
14:44:10 10 got to understand, none of this is ever done in
14:44:12 11 a vacuum. It's coupled with the chemistry,
14:44:14 12 coupled with the morphology, and also we have a
14:44:16 13 pretty good idea of what kind of matrix it's in.

14:44:20 14 Q. (By Mr. Chachkes) Okay.

14:44:21 15 **A. It's cosmetic talc.**

14:44:22 16 Q. So, I'm sorry, the methods you use to
14:44:26 17 identify asbestos are -- there's TEM, there's XRD,
14:44:34 18 and there's PLM. Are those the three, the big three?

14:44:38 19 **A. Those are the -- really the only ones
14:44:41 20 is -- yeah, XRD is used, but the big two are TEM and
14:44:47 21 PLM.**

14:44:47 22 Q. Okay. So is there anything in the
14:44:52 23 published scientific literature, peer-reviewed, that
14:44:55 24 says you can take an analysis under each of TEM, XRD,
14:45:00 25 and PLM, none of which conclusively point to a

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14:45:04 1 regulated asbestos, but together you can determine
14:45:07 2 that it's a regulated asbestos?

14:45:09 3 MR. CIRSCH: Object to form.

14:45:10 4 THE WITNESS: Well, you're wrong about
14:45:18 5 this. XRD cannot point to anything. Can't tell
14:45:21 6 you if it's fibrous or not.

14:45:24 7 Polarized light microscopy by itself can
14:45:26 8 tell you if you have regulated asbestos.

14:45:29 9 Transmission electron microscopy itself can tell
14:45:31 10 you if it's regulated asbestos.

14:45:34 11 Both techniques have their strengths and
14:45:38 12 their weaknesses. This type of analysis, in my
14:45:41 13 opinion, needs the suite of techniques: the PLM,
14:45:48 14 the Blount PLM, and TEM.

14:45:51 15 For Vermont and Italian talc, I don't
14:45:54 16 think XRD serves any useful purpose.

14:45:56 17 Q. (By Mr. Chachkes) Okay. Let's just ask
14:45:58 18 the question again.

14:46:00 19 Now, the assumption of the hypothetical is
14:46:02 20 that your TEM result independently does not
14:46:07 21 conclusively point to a regulated asbestos, that your
14:46:11 22 XRD independently, that is, independent of the other
14:46:14 23 analyses, does not conclusively point to a regulated
14:46:17 24 asbestos, and that your PLM, similarly, independently
14:46:20 25 does not point to a regulated asbestos.

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14:46:22 1 Can those three together conclusively
 14:46:28 2 point to a regulated asbestos --
 14:46:31 3 MR. CIRSCH: Object to form.
 14:46:32 4 Q. (By Mr. Chachkes) -- each one making up
 14:46:33 5 for the other's defects, in a way?
 14:46:36 6 MR. CIRSCH: Object to form.
 14:46:36 7 THE WITNESS: Well, there's no defects
 14:46:38 8 like you state. I can't answer a question where
 14:46:40 9 you're saying if all three are negative or
 14:46:42 10 nondetects, because it's either nondetect or you
 14:46:45 11 have identified the regulated asbestos.
 14:46:47 12 So if you're telling me I have three
 14:46:49 13 nondetects, then, no, I can't point to any
 14:46:52 14 regulated asbestos in three nondetects.
 14:46:54 15 Q. (By Mr. Chachkes) Okay.
 14:46:55 16 A. **Before you start, we've been going over an**
 14:46:57 17 **hour. Can we go off the record?**
 14:46:59 18 Q. Can I maybe ask a couple more questions on
 14:47:01 19 the same line, and I'll finish it up, if that's okay?
 14:47:03 20 A. **If you insist.**
 14:47:04 21 Q. I don't do this that often but --
 14:47:06 22 A. **That's fine.**
 14:47:07 23 Q. It's fascinating science.
 14:47:09 24 Okay. So we agreed that the single zone
 14:47:16 25 axis SAED pattern in a vacuum didn't point to
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14:47:18 1 asbestos, right, even though you're saying it's
 14:47:20 2 asbestos; right?
 14:47:22 3 MR. CIRSCH: Object to form.
 14:47:23 4 THE WITNESS: I don't think we agreed to
 14:47:24 5 that. It depends on the zone that you get. If
 14:47:28 6 you were to sit down and just look at that by
 14:47:32 7 itself, a 302, you could probably eliminate a
 14:47:36 8 lot.
 14:47:37 9 But based with all the other information,
 14:47:39 10 if the zone axis -- if you're getting a zone
 14:47:42 11 axis, that means you have something that you got
 14:47:44 12 a zone axis off of.
 13 Q. (By Mr. Chachkes) Right.
 14 A. **But you're asking this hypothetical in a**
 14:47:47 15 **vacuum. That's not what we do. I can't -- I've not**
 14:47:52 16 **sat down and tried since graduate school where they**
 14:47:54 17 **give you a mineral and just give you XRD pattern and**
 14:47:57 18 **say go identify it. It's not something that we would**
 14:48:01 19 **ever do for any of these analyses without the**
 14:48:03 20 **morphology and without the chemistry.**

14:48:07 21 Q. Okay. Last question. I'll ask it one
 14:48:11 22 more time because I don't think I've gotten the
 14:48:13 23 answer. If you want to give the same answer, it's
 14:48:16 24 fine, but I'm giving you the opportunity to answer
 14:48:18 25 this.

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14:48:19 1 If I had a single crystal, I had a TEM
 14:48:21 2 analysis that in a vacuum could point to many things,
 14:48:25 3 not just asbestos, an XRD that could point to many
 14:48:29 4 things, not just asbestos, and in a vacuum PLM that
 14:48:32 5 could point to many things, not just asbestos, is
 14:48:35 6 there any published peer-reviewed literature that I
 14:48:38 7 can look at that says that's a situation where you
 14:48:41 8 can combine the three and say that indeed is
 14:48:43 9 asbestos?
 14:48:44 10 MR. CIRSCH: Object to form.
 14:48:45 11 THE WITNESS: I can't answer a
 14:48:46 12 hypothetical that would never happen in a
 14:48:49 13 working real lab that does this analysis. You
 14:48:51 14 wouldn't sit there and go, I've run these three
 14:48:53 15 and I have no clue what it is, now I'm going to
 14:48:57 16 combine it all together and say, gee, that's
 14:48:58 17 going to tell me.
 14:48:59 18 I can't answer that hypothetical.
 14:49:03 19 Somebody else will have to wade through that
 14:49:05 20 one.
 14:49:06 21 MR. CHACHKES: Okay. Let's take a break.
 14:49:08 22 THE WITNESS: Thank you.
 14:49:08 23 (Recess from 2:49 p.m. to 3:07 p.m.)
 15:07:57 24 Q. (By Mr. Chachkes) So Dr. Longo, in your
 15:09:18 25 diffraction verification documents, sometimes the
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14:47:18 1 bottom -- that's not a good example.
 15:09:30 2 Let's look at Exhibit 16, and let's look
 15:09:38 3 at the first verification page. Sometimes in the
 15:09:41 4 lower left, as we discussed, the zone axis
 15:09:44 5 information is just not -- there's nothing filled in
 15:09:47 6 there; right?
 15:09:47 7 A. **Correct.**
 15:09:47 8 Q. If it's blank, does that mean that this
 15:09:54 9 particular image was not taken at a zone axis?
 15:09:57 10 A. **That is correct.**
 15:09:58 11 Q. Does MAS maintain nonasbestiform reference
 15:10:06 12 samples for tremolite?
 15:10:08 13 A. **Well, yes and no. Most -- tremolite**
 15:10:15 14 **standard has both. If you go to the one I brought --**
 15:10:26 15 **and when we say nonasbestiform, we're saying it's not**
 15:10:31 16 **meeting the 5-to-1 aspect ratio. That's less. It**
 15:10:36 17 **certainly still could be asbestiform since it's**
 15:10:39 18 **fibrous, but those we do not count in our analysis**
 15:10:46 19 **using the TEM protocols, which are the standard**
 15:10:46 20 **methods for scientists to identify asbestos. And you**
 15:10:50 21 **can understand, these protocols are all heavily**
 15:10:54 22 **v vetted and peer-reviewed.**

15:10:55 23 **For example, my ASTM D5755 method took six**
 15:11:03 24 **years to get it through the 125 scientists. And all**
 15:11:07 25 **these methods have been published in the**

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15:11:10 1 peer-reviewed literature since any time anybody
 15:11:14 2 publishes anything on the measurement of asbestos,
 15:11:16 3 they will reference one of these protocols.

15:11:19 4 Q. Do you remember what my original question
 15:11:22 5 was? So the question was do you have -- so let's
 15:11:24 6 make it easier.

15:11:25 7 Do you have a bottle of nonasbestiform
 15:11:27 8 tremolite at MAS?

15:11:29 9 MR. CIRSCH: Object to form.

15:11:30 10 THE WITNESS: I'm not sure a bottle of
 15:11:32 11 nonasbestiform tremolite actually exists. You
 15:11:34 12 typically find both. Somebody may call it
 15:11:37 13 nonasbestiform; but when you go look through it,
 15:11:40 14 or they say it's asbestos, you'll find
 15:11:42 15 structures that are less than the 5-to-1 aspect
 15:11:47 16 ratio. We don't count those.

15:11:49 17 Q. (By Mr. Chachkes) Do you have a bottle at
 15:11:52 18 MAS of nonasbestos -- of tremolite where, on average,
 15:11:56 19 its aspect ratio is below 5-to-1?

15:11:59 20 MR. CIRSCH: Object to form.

15:12:00 21 THE WITNESS: I'm not sure any such thing
 15:12:02 22 exists. We don't have what doesn't exist.

15:12:05 23 Q. (By Mr. Chachkes) Okay. Do you have a
 15:12:06 24 bottle in your office of anthophyllite where the
 15:12:11 25 aspect ratio of the anthophyllite is all underneath

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15:12:14 1 5-to-1?

15:12:15 2 MR. CIRSCH: Object to form.

15:12:16 3 THE WITNESS: No. You have them that have
 15:12:19 4 a range of aspect ratios, less than 5-to-1,
 15:12:23 5 greater than 5-to-1. The average is typically
 15:12:25 6 above 5-to-1.

15:12:26 7 Q. (By Mr. Chachkes) Okay. So you don't
 15:12:27 8 have a bottle in your office of an amphibole that has
 15:12:37 9 aspect ratios averaging under 5-to-1?

15:12:41 10 MR. CIRSCH: Object to form.

15:12:42 11 THE WITNESS: No. All the bottles with
 15:12:44 12 standards we have are actual asbestos, but they
 15:12:46 13 do have a portion that are below 5-to-1.

15:12:48 14 Q. (By Mr. Chachkes) And that's because it's
 15:12:50 15 a big bell curve and some of that bell curve is over
 15:12:53 16 on the less than 5-to-1 and some of it is on the
 15:12:55 17 right?

15:12:55 18 A. That's correct. The NIST standard for
 15:12:58 19 tremolite, I think the average -- even with the less
 15:13:00 20 than 5-to-1, greater than 5-to-1, is around 10.

15:13:04 21 Q. Is your opinion that there's literature
 15:13:13 22 supporting your position that you always find both
 15:13:16 23 asbestiform and nonasbestiform amphiboles together?

15:13:19 24 A. I believe so.

15:13:20 25 Q. Can you tell me --

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15:13:22 1 A. I can't tell you right now. I mean,
 15:13:24 2 sometimes I anticipate cross-exam -- you know,
 15:13:28 3 discovery depositions, but I'm not aware of any that
 15:13:32 4 somebody states this is all, quote, nonasbestiform or
 15:13:35 5 all cleavage fragments.

6 Q. Okay.

15:13:38 7 A. What I see -- and I'll have to dig it
 15:13:40 8 up -- is that if you have one, you have the other.

15:13:42 9 Q. And you don't cite any such literature in
 15:13:45 10 your expert report, do you?

15:13:47 11 A. No, sir, I'm not making the claim that --
 15:13:52 12 what I'm doing in my expert report is saying here's
 15:13:55 13 what we measured using the standard TEM, well-vetted
 15:14:00 14 protocols for the identification of regulated
 15:14:02 15 asbestos.

15:14:04 16 Q. Do you remember the question was about
 15:14:03 17 whether --

15:14:04 18 MR. CIRSCH: I don't know if he finished
 15:14:05 19 the answer yet.

15:14:06 20 Q. (By Mr. Chachkes) Yeah. Do you remember
 15:14:08 21 the question?

22 MR. CIRSCH: I --

23 THE WITNESS: I remember --

24 THE REPORTER: One at a time.

25 THE WITNESS: I remember the question, but
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15:14:14 1 the answer is it's not something that I was

15:14:16 2 relying on for my identification of regulated

15:14:18 3 asbestos. I'm relying on the peer-reviewed

15:14:22 4 publications for the standard TEM methods and

15:14:26 5 standard PLM methods.

15:14:27 6 Q. (By Mr. Chachkes) Do you have a standard
 15:14:28 7 in your lab of an SAED readout for an amphibole with
 15:14:35 8 ratios of less than 5-to-1 aspect ratios?

15:14:39 9 MR. CIRSCH: Object to form.

15:14:46 10 Q. (By Mr. Chachkes) So I'm not asking

15:14:47 11 whether you have incidentally such a thing but a
 15:14:49 12 standard that you use to compare against?

15:14:52 13 A. Well, no, there's nothing to compare. The
 15:14:56 14 less than 5-to-1 aspect ratio versus greater than
 15:14:59 15 5-to-1 aspect ratio will have the identical

15:15:02 16 d-spacings and identical diffraction patterns.

15:15:05 17 There's no difference in a, quote, less than 5-to-1
 15:15:08 18 and greater than 5-to-1. You just will have the

15:15:12 19 exact same type of patterns for d-spacing, and if you
 15:15:14 20 were to do a zone axis, you'll have the same zone

21 axis.

15:15:18 22 Q. Okay. So it's your opinion that for SAED,
 15:15:20 23 a single nonasbestiform tremolite crystal and a

15:15:24 24 single asbestiform tremolite crystal will have the
 15:15:28 25 same SAED patterns?

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15:15:31 1 MR. CIRSCH: Object to form.
 15:15:32 2 THE WITNESS: Yes.
 15:15:32 3 Q. (By Mr. Chachkes) Okay. Is the same true
 15:15:33 4 for EDXA?
 15:15:34 5 A. It is.
 15:15:34 6 Q. Is the same true that the PLM will look
 15:15:38 7 the same for an asbestosiform fragment and a
 15:15:41 8 nonasbestiform fragment of tremolite?
 15:15:44 9 A. Well, let's be clear. I'm not calling it
 15:15:47 10 asbestosiform and nonasbestiform. I'm calling it --
 15:15:49 11 for the 22262-1, it's materials that are less than
 15:15:54 12 3-to-1 aspect ratio. They'll have the same
 15:16:00 13 refractive indices, same information.
 15:16:03 14 There's no difference in the crystalline
 15:16:04 15 structure between what's less than 5-to-1 or less
 15:16:08 16 than whatever the aspect ratio is for a particular
 15:16:11 17 method that you're using. There's no difference.
 15:16:14 18 That's how you either count greater than
 15:16:17 19 or equal to 5-to-1 aspect ratio for TEM. Or in the
 15:16:22 20 PLM we're looking at bundles that typically are -- I
 15:16:26 21 think all of them were -- the individual fibers and
 15:16:28 22 the bundles were greater than 20-to-1.
 15:16:31 23 Where we draw the line is in the method
 15:16:34 24 when it says anything less than 3-to-1 is not
 15:16:36 25 counted. And that's what we do. We call them

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15:16:38 1 cleavage fragments.
 15:16:39 2 Q. Have you ever heard anyone distinguishing
 15:16:41 3 asbestosiform and nonasbestiform tremolite by virtue of
 15:16:44 4 whether it has parallel fibers?
 15:16:48 5 MR. CIRSCH: Object to form.
 15:16:49 6 THE WITNESS: Yes. If it is a bundle, by
 15:16:52 7 definition, it is asbestosiform. Both Ann Wylie
 15:16:56 8 and both the 22262-1 and the R-93 as well as --
 15:17:02 9 and TEM's different. You take the overall
 15:17:05 10 aspect ratio of a bundle width to length.
 15:17:09 11 That's how we distinguish between a regulated
 15:17:13 12 asbestos fiber and not. But even in TEM, if it
 15:17:15 13 is a bundle, hence it is asbestosiform.
 15:17:17 14 Q. (By Mr. Chachkes) Okay. Would the SAED
 15:17:19 15 pattern for tremolite with parallel fibers and
 15:17:22 16 tremolite that does not exhibit parallel fibers be
 15:17:26 17 the same?
 15:17:27 18 A. Yes.
 15:17:28 19 Q. Okay. Same --
 15:17:29 20 A. For the right orientation, same
 15:17:31 21 orientation, yeah. Yes.
 15:17:32 22 Q. What about on all three orientations?
 15:17:35 23 A. I haven't done it on all three
 15:17:37 24 orientations because we don't count those if it has
 15:17:40 25 less than the counting aspects, and we typically only

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15:17:43 1 do d-spacings following the peer-reviewed published
 15:17:46 2 protocols.
 15:17:47 3 Q. Okay. Do you have any opinion on whether
 15:17:50 4 a tremolite with parallel fibers and a tremolite that
 15:17:53 5 does not have parallel fibers would indeed have
 15:17:56 6 identical d-spacings on all three axes for SAED?
 15:18:03 7 A. We haven't done three-axis SAEDs for
 15:18:08 8 something that is not counted as a regulated asbestos
 15:18:11 9 fiber. Single individual fibers will have the same
 15:18:16 10 d-spacing range, will have the same selected area
 15:18:20 11 electron diffraction zone axis if you go to the
 15:18:23 12 particular orientation.
 15:18:25 13 Q. So I'm going to ask again because my
 15:18:29 14 question's only about -- it's not about what you've
 15:18:30 15 done, it's about what something looks like.
 15:18:37 16 Does the SAED for tremolite that has
 15:18:39 17 parallel fibers look exactly the same on three axes
 15:18:44 18 as a tremolite that does not have parallel fibers?
 15:18:48 19 MR. CIRSCH: Object to form.
 15:18:49 20 Q. (By Mr. Chachkes) Putting aside whether
 15:18:51 21 you've done it or not, as a matter of science, are
 15:18:54 22 they the same? You can say you don't know, but I
 15:18:56 23 need that question answered.
 15:18:57 24 MR. CIRSCH: Object to form.
 15:18:58 25 THE WITNESS: It should be the same. But

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15:18:59 1 it's not something that we do, because it's not
 15:19:01 2 part of the peer-reviewed published standard
 15:19:04 3 protocols. When it is -- when it is not
 15:19:10 4 parallel sides or it doesn't meet the 5-to-1
 15:19:12 5 aspect ratio, it is not recorded.
 15:19:15 6 Q. (By Mr. Chachkes) Do you know of any
 15:19:17 7 published literature that confirms that they should
 15:19:20 8 be the same?
 15:19:21 9 A. It's not -- I believe so, yes.
 15:19:35 10 Q. What?
 15:19:35 11 A. Again, it has to do with surface charts.
 15:19:41 12 I don't recall the citation.
 15:19:42 13 Q. Okay. Sitting here today you can't give
 15:19:44 14 me a citation for that?
 15:19:45 15 A. No, sir, I did not anticipate that we were
 15:19:48 16 going to be debating non -- debating asbestos
 15:19:54 17 minerals that we don't count or don't put into our
 15:19:58 18 report.
 15:19:58 19 Q. Okay. What about under PLM, does a
 15:20:03 20 tremolite that has parallel fibers look the same
 15:20:07 21 under PLM as a tremolite that does not have parallel
 15:20:11 22 fibers?
 15:20:11 23 A. No.
 15:20:12 24 Q. What about TEM when you're looking at just
 15:20:15 25 morphology, do the two look the same?

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15:20:18 1 A. If it's not parallel, it's not going to
 15:20:20 2 look the same. If it's PLM and you can't see the
 15:20:22 3 individual fibers in the bundles, it's not going to
 15:20:25 4 look the same.
 15:20:25 5 Q. Okay. Do you have a standard reference
 15:20:28 6 standard for PLM for tremolite that does not have
 15:20:35 7 parallel fibers?
 15:20:36 8 A. And again, I guess we're going back to a
 15:20:39 9 bottle of cleavage fragments. No. But we do
 15:20:42 10 routinely see tremolite/actinolite cleavage fragments
 15:20:48 11 that are less than 3-to-1 aspect ratio that is
 15:20:51 12 recorded in -- and they have the same properties that
 15:20:55 13 give us the refractive indices and identification.
 15:20:57 14 Otherwise, you wouldn't be able to identify it.
 15:20:59 15 Q. Do you have a standard TEM photograph
 15:21:03 16 showing morphology that is for tremolite that does
 15:21:08 17 not exhibit parallel fibers?
 15:21:12 18 A. I don't know if we have recorded typical
 15:21:17 19 nonparallel sides on a TEM structure that has the
 15:21:22 20 same chemistry, but we do not record any of our
 15:21:26 21 analyses as per the peer-reviewed published
 15:21:30 22 protocols.
 15:21:31 23 Q. Okay. Would your answers be the same for
 15:21:36 24 anthophyllite?
 15:21:36 25 A. It would be the same.

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15:21:38 1 Q. Okay. For all those questions whether you
 15:21:40 2 keep the separate standard?
 15:21:42 3 MS. O'DELL: Object to the form.
 15:21:44 4 THE WITNESS: If -- we don't keep a
 15:21:45 5 separate standard because we do not record
 15:21:49 6 amphibole structures that have the same
 15:21:51 7 chemistry, same diffraction pattern types, that
 15:21:55 8 are not part of the counting protocols for these
 15:21:58 9 peer-reviewed protocols for the analysis.
 15:22:01 10 Q. (By Mr. Chachkes) Taking you back to your
 15:22:05 11 November reports, your November 14 reports, it's my
 15:22:09 12 understanding that in it you confirmed that -- that
 15:22:28 13 in it you confirm that the SAED confirmed regulated
 15:22:33 14 asbestos; is that correct?
 15:22:35 15 MR. CIRSCH: Object to form.
 15:22:36 16 THE WITNESS: We confirmed that the -- I
 15:22:42 17 don't believe we said it like that. What we
 15:22:44 18 confirmed is following the peer-reviewed
 15:22:48 19 published protocols, either for TEM or polarized
 15:22:53 20 light microscopy using the methodology that
 15:22:56 21 takes you through the steps to determine if it's
 15:22:59 22 regulated asbestos, primarily the counting rule,
 15:23:02 23 the chemistry, and the crystalline structure.
 15:23:05 24 That's why they have all three. None of this is
 15:23:08 25 done in a vacuum. That's what we did.

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15:23:11 1 Q. (By Mr. Chachkes) Let me just ask you the
 15:23:15 2 straight question. Did your November report confirm
 15:23:17 3 that SAED patterns confirmed regulated asbestos in
 15:23:21 4 J&J bottles of talc?
 15:23:25 5 MR. CIRSCH: Object to form.
 15:23:25 6 THE WITNESS: I'd have to see the context
 15:23:27 7 because it has to be all the information that's
 15:23:30 8 done. Regulated asbestos goes with the counting
 15:23:34 9 rules, that's the first -- counting rules on the
 15:23:36 10 structure, parallel sides, the diffraction
 15:23:40 11 pattern, and the chemistry. That's how the
 15:23:43 12 protocol says to do this. Not just an SAED by
 15:23:48 13 itself, not an EDS by itself, and not the
 15:23:52 14 morphology by itself. You have to use all three
 15:23:55 15 for TEM analysis. That's how the protocol goes.
 15:24:03 16 MR. CHACHKES: Okay. Let me ask you in
 15:24:04 17 this way. Let's mark this next exhibit.
 15:24:04 18 (Defendants' Exhibit 18 was marked for
 15:24:23 19 identification.)
 15:24:23 20 Q. (By Mr. Chachkes) So can you confirm that
 15:24:25 21 Exhibit 18 is one of your SAEDs?
 15:24:29 22 MR. CIRSCH: On the back of here I see
 15:24:30 23 some -- okay.
 15:24:30 24 MS. TROVATO: On the back -- sorry.
 15:24:30 25 MR. CHACHKES: Here. Take mine.

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15:24:32 1 MR. CIRSCH: I wanted to make sure that
 15:24:38 2 you --
 15:24:38 3 Q. (By Mr. Chachkes) So can you confirm
 15:24:41 4 Exhibit 18 is of your SAED patterns?
 15:24:46 5 MS. O'DELL: Would you direct us? Is
 15:24:47 6 there a specific page in his November report
 15:24:48 7 that you're referring to?
 15:24:50 8 THE WITNESS: I see it right here. It's
 15:24:51 9 the M68233-001-001, which matches the M number
 15:25:00 10 and fiber number. It says that we -- date of
 15:25:04 11 photo was 2/14/2018. So that is one of our
 15:25:09 12 diffraction patterns.
 15:25:10 13 Q. (By Mr. Chachkes) Okay. Does this
 15:25:14 14 confirm that there is anthophyllite in J&J talc,
 15:25:21 15 Exhibit 18 alone?
 15:25:23 16 A. You keep saying alone, and you keep saying
 15:25:26 17 in a vacuum. That's not how it's done. The
 15:25:30 18 methodology doesn't say take the SAED alone. We have
 15:25:34 19 the chemistry that goes with it and the morphology.
 15:25:36 20 There's a reason it takes you through those steps.
 15:25:39 21 Q. Okay. So the question is does Exhibit 18
 15:25:45 22 alone confirm anthophyllite?
 15:25:49 23 MR. CIRSCH: Object.
 15:25:49 24 Q. (By Mr. Chachkes) It's just yes or no.
 15:25:50 25 MR. CIRSCH: It's not yes or no.

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15:25:51 1 THE WITNESS: It's not yes or no. It's --
 15:25:54 2 again, my answer is you do not look at these
 15:25:57 3 patterns alone. You're using a peer-reviewed
 15:26:01 4 published protocol that walks you through
 15:26:04 5 morphology, EDXA, and a diffraction pattern.
 15:26:09 6 That's how the protocol goes.

15:26:11 7 It's not my protocol. These are the
 15:26:13 8 protocols for the ISO methods, for the AHERA
 15:26:16 9 methods, the ASTM -- TEM methods. There is a
 15:26:19 10 reason you do all of them.

15:26:21 11 Q. (By Mr. Chachkes) Right. So it's my
 15:26:23 12 understanding that this is an answerable question.
 15:26:25 13 If you say it's completely unanswerable, tell me.
 15:26:30 14 And I understand you don't like it when I've asked
 15:26:32 15 you about something in a vacuum, but the question
 15:26:34 16 stands. In a vacuum, Exhibit 18, is that a uniquely
 15:26:37 17 anthophyllite pattern?

15:26:37 18 MR. CIRSCH: Object to form. That's been
 15:26:39 19 asked and answered.

15:26:40 20 THE WITNESS: And my answer stands.

15:26:41 21 Q. (By Mr. Chachkes) Okay. And that
 15:26:43 22 answer's what? If you're not going to answer, just
 15:26:48 23 tell me.

15:26:48 24 MS. O'DELL: He's already answered.

15:26:48 25 MR. CIRSCH: He's already answered the

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15:26:51 1 question.

15:26:51 2 THE WITNESS: My answer stands. The
 15:26:53 3 previous answer.
 15:26:53 4 Q. (By Mr. Chachkes) Okay. Now, I'm looking
 15:26:54 5 at Exhibit 17, which I believe corresponds to this;
 15:26:56 6 right?

15:26:58 7 A. Yes.

15:26:59 8 Q. Okay. Page 1 of the -- the first
 15:27:03 9 verification, it shows date verified as 2/14. Do you
 15:27:07 10 see that?

15:27:07 11 A. Correct.

15:27:08 12 Q. That means on the same day of the photo
 15:27:12 13 you actually put this picture into the software to
 15:27:14 14 determine the d-spacing; correct?

15:27:16 15 A. That's correct.

15:27:17 16 Q. Okay. For many of the SAED patterns that
 15:27:21 17 have been produced in this case, the verification
 15:27:24 18 came after your November report; correct?

15:27:27 19 A. That's correct.

15:27:27 20 Q. Some of them came after -- came as late as
 15:27:33 21 January; right?

15:27:33 22 A. That may be possible.

15:27:34 23 Q. Okay. So you were using, for the purposes
 15:27:36 24 of at least the November report, some of the EDSA
 15:27:41 25 patterns you had not run d-spacing on?

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15:27:44 1 MR. CIRSCH: Object to form.

15:27:45 2 THE WITNESS: That's correct. Well, we
 15:27:46 3 had taken the data, and the photograph was
 15:27:50 4 taken. You know, when the verification came
 15:27:52 5 through, it may have been done later.

15:27:54 6 Q. (By Mr. Chachkes) Yeah, and I might have
 15:27:56 7 misspoke.

15:27:56 8 So what I'm saying is that for some of the
 15:27:58 9 samples in the November report, you had not run the
 15:28:01 10 d-spacing for the SAED; is that correct?

15:28:04 11 A. That's possible.

15:28:05 12 Q. Okay. Is the d-spacing important to
 15:28:08 13 determining whether SAED is pointing towards a
 15:28:11 14 regulated asbestos?

15:28:13 15 MR. CIRSCH: Object to form.

15:28:14 16 THE WITNESS: It's all important. If you
 15:28:16 17 do this long enough, you can look at it and say
 15:28:18 18 that's an amphibole diffraction pattern. But
 15:28:20 19 the verification just solidifies it.

15:28:23 20 Q. (By Mr. Chachkes) Okay. Why did you run
 15:28:30 21 verifications after your first report and as late as
 15:28:36 22 January for SAED verifications?

15:28:41 23 MR. CIRSCH: Object to form.

15:28:42 24 THE WITNESS: Because they've all been
 15:28:44 25 taken, just getting to them. Certainly if it

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15:28:46 1 didn't verify it, then we'd have something else
 15:28:49 2 to talk about today.

15:28:50 3 Q. (By Mr. Chachkes) How many particles did
 15:29:02 4 your analyst conduct zone axis determinations on?

15:29:05 5 MR. CIRSCH: Object to form.

15:29:06 6 THE WITNESS: How many fibrous structures?

15:29:08 7 Q. (By Mr. Chachkes) Yes.

15:29:09 8 A. I haven't counted them up.

15:29:10 9 Q. Could it be about a dozen?

15:29:12 10 MR. CIRSCH: Object to form.

15:29:13 11 THE WITNESS: Again, I haven't counted
 15:29:14 12 them up.

15:29:15 13 Q. (By Mr. Chachkes) Okay. And earlier we
 15:29:18 14 talked about how it's difficult to distinguish talc
 15:29:24 15 and anthophyllite with EDXA; right?

15:29:30 16 MR. CIRSCH: Object to form.

15:29:31 17 THE WITNESS: I didn't say it was

15:29:32 18 difficult. What I said was you would not
 15:29:35 19 identify it by just EDXA. You would use the
 15:29:38 20 procedures in place, all the procedures, to make
 15:29:41 21 that determination if you have fibrous talc
 15:29:44 22 versus anthophyllite.

15:29:44 23 Q. (By Mr. Chachkes) And when you say all
 15:29:45 24 the procedures, you mean procedures above and beyond
 15:29:47 25 EDXA?

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15:29:48 1 A. **Procedures that are stated in the**
15:29:52 2 **peer-reviewed protocols that we use.**

15:29:54 3 Q. That are above and beyond EDXA?

15:29:57 4 MR. CIRSCH: Object to form.

15:29:59 5 THE WITNESS: Well, they're all above and
15:30:02 6 beyond EDXA. None of this is done in a vacuum.

15:30:05 7 No analyst is just looking at the EDXA and not
15:30:06 8 following the protocols as published in the
15:30:07 9 peer-reviewed literature for making these
15:30:09 10 determinations.

15:30:10 11 Q. (By Mr. Chachkes) You were saying that a
15:30:11 12 way to tell the difference between talc and
15:30:15 13 anthophyllite in SAED is to tilt the goniometer --

15:30:27 14 A. **Goniometer.**

15:30:28 15 Q. -- goniometer; is that right?

15:30:30 16 A. **That's correct.**

15:30:31 17 Q. Okay. In every instance -- are there
15:30:41 18 instances where you looked at a particle for a J&J
15:30:47 19 sample in the MDL and tilted the gon --

15:30:56 20 A. **Goniometer.**

15:30:56 21 Q. -- goniometer and determined, oh, well,
15:30:58 22 that's talc?

15:30:59 23 A. **That's certainly possible.**

15:31:06 24 Q. Okay. Is it that you don't know because
15:31:09 25 your analyst would have done it and not reported that

15:32:25 1 it's JBP-084.

15:32:31 2 Q. Earlier we talked about how cummingtonite

15:32:39 3 and anthophyllite have the same chemistry; do you

15:32:42 4 remember that?

15:32:42 5 A. Yes.

15:32:42 6 Q. One way to tell them apart is to determine

15:32:45 7 the crystal system of the particle?

15:32:47 8 A. Correct. You could go in and do zone axis

15:32:50 9 and get a monoclinic versus the orthorhombic.

15:32:53 10 Q. Okay. So anthophyllite is orthorhombic,

15:32:56 11 and cummingtonite is monoclinic?

15:32:59 12 A. That is correct.

15:32:59 13 Q. Okay. Did you do the analysis to

15:33:03 14 determine whether what you were looking at and

15:33:07 15 thought might be anthophyllite to see whether it was

15:33:10 16 monoclinic and thus cummingtonite?

15:33:12 17 A. No, we don't do that. We just call it the

15:33:15 18 anthophyllite solid solution series since both

15:33:18 19 anthophyllite, cummingtonite, and grunerite are

15:33:22 20 regulated asbestos.

21 Q. Okay.

15:33:23 22 A. There's no -- unless you want to do that

15:33:26 23 for some reason, there's no need to go any further.

15:33:28 24 Q. Okay. So everything in your expert report

15:33:31 25 that you identify as anthophyllite could very well be

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15:31:11 1 to you?

15:31:12 2 MR. CIRSCH: Object to form.

15:31:12 3 THE WITNESS: Well, we were only taking a

15:31:14 4 random talc verification of some of these for

15:31:17 5 one fiber, it's at the end of the -- each of the

15:31:21 6 analyses where there was fibrous talc present in

15:31:24 7 the TEM, there is an SAED, EDS, and a picture

15:31:30 8 showing the morphology.

15:31:31 9 These particular ones are not talc. These

15:31:36 10 are zone axis. This happens to be the

15:31:41 11 historical 1978 that was produced through

15:31:47 12 Lanier, and these zone axis orientations are not

15:31:52 13 what the so-called look-alike zone axis for the

15:31:57 14 talc fiber.

15:31:59 15 Q. (By Mr. Chachkes) I'm sorry, you're

15:32:00 16 saying that what's in Exhibit 17 are non-MDL samples?

15:32:06 17 A. **No, it is an MDL sample. I said it is an**

15:32:08 18 **MDL sample.**

15:32:09 19 Q. Oh, okay. When you said produced through

15:32:11 20 Lanier, I didn't understand what you meant there.

15:32:14 21 A. **Well, it went to Lanier and went to us.**

22 Q. Okay.

15:32:18 23 A. **The 1978 --**

15:32:21 24 Q. Got it.

15:32:25 25 A. **-- two samples for one container. I think**

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15:33:36 1 cummingtonite, but your position it doesn't matter?

15:33:39 2 MR. CIRSCH: Object to form.

15:33:40 3 THE WITNESS: Well, everything could be

15:33:42 4 anthophyllite and it still doesn't matter. You

15:33:45 5 know, if you use the analogy, well, I found the

15:33:48 6 weed and it's a particular weed that is a

15:33:50 7 problem and we need to get rid of it, now I want

15:33:53 8 to go look and see what color roots it has

15:33:55 9 because the weed itself all looks the same.

15:33:58 10 This particular one, these zone axes are

15:34:00 11 anthophyllite for, I believe, in these two --

15:34:05 12 this was the one that Dr. Sanchez says was

15:34:08 13 cummingtonite, and so we went back and did zone

15:34:11 14 axis just some time ago. And actually, these

15:34:14 15 two structures are in fact anthophyllite.

15:34:17 16 Q. (By Mr. Chachkes) You mean you do zone

15:34:19 17 axis to determine whether it was orthorhombic or

15:34:22 18 monoclinic?

15:34:23 19 A. **Well, we did zone axis to make sure that**

15:34:25 20 **it was orthorhombic and had the reflections, that it**

15:34:28 21 **had the crystalline orientation specific for**

15:34:30 22 **orthorhombic anthophyllite.**

15:34:32 23 Q. Did you produce the material that shows

15:34:33 24 that sample to be orthorhombic?

15:34:36 25 A. **Number 17.**

15:34:37 1 Q. That's number 17? Okay.
 15:34:40 2 A. **The first one, especially. I know for the**
 15:34:42 3 **301.**
 15:34:44 4 Q. And for the other -- it's fair to say that
 15:34:50 5 most of the particles in this case that you've
 15:34:52 6 identified as anthophyllite could very well be
 15:34:55 7 cummingtonite, but you didn't make the distinction?
 15:34:59 8 MR. CIRSCH: Object to form.
 15:34:59 9 Q. (By Mr. Chachkes) Putting aside whether
 15:35:01 10 it matters or not.
 15:35:02 11 MR. CIRSCH: Object to form.
 15:35:03 12 THE WITNESS: Well, most of these
 15:35:06 13 elongated particles, these asbestosiform bundles,
 15:35:10 14 could be anthophyllite --
 15:35:11 15 Q. (By Mr. Chachkes) The ones --
 15:35:12 16 MR. CIRSCH: Hold on.
 15:35:13 17 THE WITNESS: -- versus cummingtonite.
 15:35:15 18 But it's a difference without any consequence.
 15:35:18 19 They're both regulated asbestos.
 15:35:19 20 Q. (By Mr. Chachkes) Right. Putting aside
 15:35:21 21 the difference, okay -- this is just a question that
 15:35:25 22 should be very simple -- most of the part -- except
 15:35:28 23 for the one you went back and verified whether it was
 15:35:31 24 orthorhombic, most of the particles you identify in
 15:35:34 25 your report could either be -- that you identify as
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15:36:43 1 Q. That's okay. That's fine. We'll just
 15:36:44 2 leave it as is.
 15:36:45 3 A. **I believe it's -- let me just make sure**
 15:36:46 4 **it's in here.**
 15:36:55 5 **It's reference 23, Manual of Mineralogy,**
 15:36:58 6 **21st Edition, Revised, Cornelis Klein and**
 15:37:04 7 **Cornelius S. Hurlbut, Jr., from John Wiley & Sons,**
 15:37:07 8 **and it's on page about 256, if I remember correctly.**
 15:37:11 9 Q. Okay. What other mono -- okay.
 15:37:15 10 If your EDS doesn't tell you whether -- if
 15:37:19 11 you haven't determined whether what you're looking at
 15:37:21 12 is orthorhombic or monoclinic, are there any other
 15:37:24 13 minerals that they could be that are indeed also
 15:37:28 14 monoclinic?
 15:37:29 15 A. **No. Not after we do the full suite of**
 15:37:31 16 **analyses. It's one of these regulated asbestos types**
 15:37:34 17 **for the anthophyllite solid solution series.**
 18 Q. Okay.
 15:37:37 19 A. **These have been identified to the degree**
 15:37:42 20 **necessary to make that statement.**
 15:37:43 21 Q. Okay. Just -- and we're going to ask a
 15:37:45 22 question in a vacuum, and I understand all your
 15:37:48 23 objections to answering questions about science in a
 15:37:50 24 vacuum, but it's important to us.
 15:37:53 25 If you have an SAED pattern where you
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15:35:37 1 anthophyllite could either be anthophyllite or
 15:35:39 2 cummingtonite, putting aside whether it even matters;
 15:35:42 3 is that a correct statement?
 15:35:43 4 MR. CIRSCH: Object to form.
 15:35:44 5 THE WITNESS: No. You don't know if most
 15:35:46 6 of the particles could. It could be this, it
 15:35:48 7 could be that. It could be mostly all
 15:35:50 8 anthophyllite.
 15:35:52 9 You know, you think it's all
 15:35:54 10 cummingtonite. But you're right, it doesn't
 15:35:55 11 matter because I identified them as the
 15:36:01 12 anthophyllite solid solution series.
 15:36:02 13 Q. (By Mr. Chachkes) Okay. Is there
 15:36:03 14 literature calling cummingtonite part of the
 15:36:05 15 anthophyllite solid solution series?
 15:36:06 16 A. **Lots of it.**
 15:36:05 17 Q. Okay. Can you cite one for me? Let's
 15:36:10 18 start with this. Any cited in your report?
 15:36:11 19 A. **Yes.**
 15:36:12 20 Q. Okay. Can you --
 15:36:14 21 A. **Can I show it to you?**
 15:36:16 22 Q. Yes, show it to me.
 15:36:18 23 A. **And I produced it in other J&J.**
 15:36:37 24 **It's easier for me just to look through**
 15:36:41 25 **the references and find it for you.**
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15:37:56 1 didn't determine whether it's orthorhombic or not,
 15:38:00 2 just looking at that pattern, in a vacuum, without
 15:38:03 3 your other information, is it possible -- can you
 15:38:08 4 exclude -- is it possible that correlates to any
 15:38:12 5 other monoclinic minerals?
 15:38:14 6 MR. CIRSCH: Object to form.
 15:38:15 7 THE WITNESS: I've already answered this
 15:38:16 8 question.
 15:38:16 9 We don't look at it in a vacuum. You're
 15:38:18 10 asking me to look at things in a vacuum that are
 15:38:21 11 not part of the peer-reviewed published
 15:38:25 12 identification protocols for asbestos.
 15:38:27 13 That's what we do. We look at and follow
 15:38:29 14 the procedures that are in the protocols. So
 15:38:33 15 when we do this analysis, especially for
 15:38:36 16 anthophyllite, we're looking at morphology,
 15:38:38 17 we're looking at chemistry, and we're looking at
 15:38:40 18 selected area electron diffraction.
 15:38:43 19 Q. (By Mr. Chachkes) So --
 15:38:43 20 MR. CIRSCH: Hold on.
 15:38:44 21 THE WITNESS: And that's my answer.
 15:38:45 22 Q. (By Mr. Chachkes) So you understand I'm
 15:38:46 23 allowed to ask questions that aren't specifically
 15:38:49 24 correlating to something in a regulation; right? I
 15:38:51 25 can ask about general science. You understand that;
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15:38:53 1 right?
 15:38:54 2 MR. CIRSCH: Object to form. He can give
 15:38:56 3 you an answer --
 4 Q. (By Mr. Chachkes) Yes or no?
 15:38:57 5 MR. CIRSCH: -- he thinks is appropriate.
 15:38:59 6 Q. (By Mr. Chachkes) It's a yes or no
 15:39:01 7 question.
 15:39:01 8 A. Well, yes, you can ask any question you
 15:39:04 9 want. But, no, I don't think it's appropriate to ask
 15:39:07 10 questions that is not part of how we identify and ask
 15:39:12 11 in a vacuum. So my answer stands.
 15:39:13 12 Q. Okay. So I'll ask you again, and if you
 15:39:14 13 don't want to answer, you can give me the same
 15:39:16 14 circular answer, but I'm going to ask you again.
 15:39:19 15 MR. CIRSCH: Object to the commentary on
 15:39:21 16 the record, Alex. There's a lot of it.
 15:39:23 17 Q. (By Mr. Chachkes) If the -- looking at --
 15:39:26 18 if you haven't determined whether something is
 15:39:29 19 orthorhombic or not, looking at the SAED pattern in a
 15:39:36 20 vacuum, could it correspond to other minerals besides
 15:39:40 21 cummingtonite and anthophyllite?
 15:39:43 22 MR. CIRSCH: Object to form.
 15:39:45 23 THE WITNESS: That's not how we have done
 15:39:46 24 this analysis for every one of these samples
 15:39:49 25 that we're dealing with in TEM, for the 100,
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15:39:52 1 almost 200 fibers and bundles that we've
 15:39:55 2 identified. We have used the peer-reviewed
 15:39:59 3 standard published protocol specifically to
 15:40:02 4 identify regulated asbestos. We didn't look at
 15:40:05 5 anything in a vacuum. We don't do that.
 15:40:07 6 Q. (By Mr. Chachkes) Okay. Putting that
 15:40:09 7 aside, this is just a matter of EDSA science. EDSA
 15:40:14 8 science tells me that Exhibit 18 looked at in
 15:40:19 9 isolation could correspond to many minerals; right?
 15:40:25 10 MS. O'DELL: Objection.
 15:40:25 11 Q. (By Mr. Chachkes) Just EDSA science?
 15:40:28 12 A. Again, we're not dealing with many
 15:40:30 13 minerals. We're dealing with regulated asbestos in a
 15:40:33 14 talc deposit that has the ability to form these
 15:40:37 15 billions of years ago under temperature and pressure.
 15:40:40 16 We're using protocols that are specifically designed
 15:40:42 17 to identify regulated asbestos. And that's what we
 15:40:45 18 do.
 19 Q. Okay.
 15:40:47 20 A. Asking things in a vacuum or hypotheticals
 15:40:49 21 is not what we did.

15:40:51 22 MR. CHACHKES: Okay. How much time do we
 15:40:55 23 have left on the tape?
 15:40:59 24 THE VIDEOGRAPHER: 17.
 15:41:00 25 MR. CHACHKES: Why don't we just swap out

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15:41:02 1 the tape and we don't have to take a break.
 15:41:13 2 (Recess from 3:41 p.m. to 4:01 p.m.)
 16:02:00 3 Q. (By Mr. Chachkes) Dr. Longo, the court
 16:03:00 4 reporter informed me that a couple of times I
 16:03:01 5 mispronounced EDXA as EDSA. Did you understand when
 16:03:08 6 I said EDSA to mean EDXA?
 16:03:09 7 A. Yes. Energy dispersive spectroscopy
 16:03:12 8 analysis is also well known.
 9 Q. Okay.
 16:03:14 10 A. People have different acronyms for it, so
 16:03:18 11 it's fine. I think I was repeating what you were
 16:03:20 12 saying.
 16:03:20 13 Q. Okay. So is it your position that
 16:03:24 14 reporting analytical sensitivity by weight percent
 16:03:27 15 does not provide any useful information for
 16:03:30 16 determining potential airborne exposure to asbestos
 16:03:32 17 structures?
 16:03:32 18 A. Yes.
 16:03:33 19 Q. Is it your position that structures per
 16:03:37 20 gram data is the most useful for potential airborne
 16:03:40 21 exposure?
 16:03:40 22 A. Yes.
 16:03:41 23 Q. And in your report, in support of that
 16:03:44 24 proposition, you cite ISO 10312; correct?
 16:03:50 25 A. Correct. And it's in both of the ISO
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16:03:51 1 methods.
 16:03:51 2 Q. Okay. ISO 10312 is a method for detecting
 16:03:57 3 asbestos in ambient air; correct?
 16:03:58 4 A. Correct.
 16:03:59 5 Q. Have you ever conducted air testing
 16:04:02 6 pursuant to the ISO 10312 method?
 16:04:08 7 A. In the past, yes.
 16:04:10 8 Q. Okay. How many times?
 16:04:14 9 A. I don't know.
 16:04:15 10 Q. Over ten?
 16:04:16 11 A. I don't know.
 16:04:16 12 Q. Over one?
 16:04:18 13 A. Most likely over one, but how big the
 16:04:23 14 bread box is, I don't know.
 16:04:25 15 Q. Okay. Did you test anything under the
 16:04:30 16 ISO 10312 method for this case, the MDL?
 16:04:36 17 A. Well, if you look at our report, we have
 16:04:38 18 referenced a number of TEM methods for the counting
 16:04:40 19 rules, including the two ISO methods, the ASTM
 16:04:46 20 method, the AHERA method. They all have the same
 16:04:48 21 counting rules for the determination of a regulated
 16:04:51 22 asbestos fiber. The ISO methods are referred back to
 16:04:56 23 in both the 22262-1 and -2 as the counting criteria
 16:05:01 24 for fibers and bundles.
 16:05:03 25 Q. Did you do an ISO 10312 ambient air test

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16:05:07 1 for the purposes of this MDL?

16:05:09 2 A. No.

16:05:09 3 Q. And this ISO method involves collecting

16:05:14 4 air samples and testing for fibers; correct?

16:05:17 5 A. Correct.

16:05:17 6 Q. And you're not testing ambient air fibers

16:05:19 7 in this case, in this expert report?

16:05:22 8 A. No, we're not testing ambient air. But

16:05:25 9 you have to understand once the asbestos gets on the

16:05:27 10 filter, the -- and I know it sounds silly, but the

16:05:32 11 asbestos fibers don't know if it came out of ambient

16:05:34 12 air, if it came out of a water sample, came out of a

16:05:37 13 dust sample, or it came out of a bulk sample like

16:05:40 14 cosmetic talc. What's most important is the counting

16:05:43 15 rules that are the same for all these different

16:05:47 16 methods, as in the ISO 22262-2 for the TEM analysis

16:05:52 17 of talc.

16:05:53 18 Q. You did not conduct an exposure assessment

16:05:55 19 for this case, did you?

16:05:56 20 A. I haven't conducted an exposure assessment

16:06:01 21 with any MDL samples.

16:06:04 22 Q. You did employ ISO 22262; correct?

16:06:08 23 A. Yes.

16:06:08 24 Q. That does not include a formula for

16:06:12 25 reporting of data as structures per gram; correct?

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16:07:44 1 A. So if you go to 16 --

16:07:51 2 MR. CIRSCH: You're calling it Exhibit 3,

16:07:53 3 but it says on here Exhibit 5. I just want to

16:07:56 4 make sure that --

16:07:57 5 MR. CHACHKES: So Exhibit 3 should be

16:08:01 6 ISO-2?

16:08:02 7 MR. CIRSCH: It's got Exhibit 5 on it.

16:08:03 8 Q. (By Mr. Chachkes) I'm sorry, I'm reading

16:08:05 9 my number wrong -- strike that. My 3 looked like --

16:08:09 10 totally my fault.

16:08:10 11 All right. Before you is Exhibit 5, which

16:08:14 12 is part 2 of the ISO 22262 standard. Can you point

16:08:17 13 to me where it requires reporting in structures per

16:08:22 14 gram?

16:08:24 15 A. If you go to 16.3, last paragraph before

16:08:33 16 you get to 17, it says, If it is required to include

16:08:37 17 all fiber sizes in the measurement, determination of

16:08:40 18 mass fraction by TEM using 14.2.4 is the optimum

16:08:46 19 analytical procedure.

16:08:47 20 If you go to 14.2.4 -- 14.2.4.4,

16:09:12 21 Preparation of specimens for SEM or TEM observation,

16:09:17 22 then it references back to the ISO 13794.

16:09:22 23 Q. Okay. So you -- it's your understanding

16:09:25 24 that the ISO 22262 -- so first of all, the ISO 22262

16:09:31 25 -2, putting aside cross-references, itself doesn't

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16:06:15 1 A. That's correct.

16:06:15 2 Q. The --

16:06:18 3 A. Well, that's not quite true. If you go to

16:06:20 4 the ISO TEM method that it references, it shows you

16:06:25 5 how to report it in fibers or bundles per gram. So

16:06:30 6 again, you have to look at the methodology that it

16:06:33 7 references.

16:06:34 8 Q. Okay. So let me -- which ISO, 1, 2, 3 --

16:06:39 9 can you tell me -- are you referring to?

16:06:40 10 A. It's the 137 --

16:06:43 11 Q. ISO -- so it's part 1; correct?

16:06:47 12 A. Well, it's in both. It's in part 1 and

16:06:50 13 part 2.

16:06:50 14 Q. Okay. So can you point to me in part 2

16:06:54 15 where -- and that's Exhibit 3 -- where it says --

16:06:57 16 that proper reporting is done in structures per gram?

16:07:02 17 A. Did you mark that as an exhibit?

16:07:08 18 Q. Exhibit 3, yeah. It's going to be down

16:07:11 19 from the beginning.

16:07:13 20 A. It's 1. Give me a second. I will in a

16:07:27 21 second. I'm sure it's in this pile.

22 MR. CIRSCH: It might be there.

16:07:36 23 THE WITNESS: There it is.

16:07:40 24 Q. (By Mr. Chachkes) It should be Exhibit 3.

16:07:41 25 Okay.

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16:09:36 1 have a formula for reporting data as structures per

16:09:39 2 gram; correct?

16:09:40 3 A. That is correct.

16:09:41 4 Q. Okay.

16:09:41 5 A. And it doesn't have the formula for

16:09:43 6 calculating weight percent. It points you back to

16:09:48 7 the ISO TEM protocols.

16:09:51 8 Q. Okay. And then the reference to 14.2.4,

16:09:55 9 that section is entitled, Determination of asbestos

16:10:00 10 weight mass fraction from fiber measurement made by

16:10:03 11 PLM, SEM, or TEM.

16:10:04 12 That's the title; right?

16:10:06 13 A. Correct.

16:10:06 14 Q. Okay. I just want to do a little walk

16:10:11 15 through one of the calculations you made so I can

16:10:13 16 figure it out.

16:10:14 17 Can I have the exhibits? Mark this as

16:10:18 18 Exhibit 19.

16:10:19 19 (Defendants' Exhibit 19 was marked for

16:10:17 20 identification.)

16:10:48 21 Q. (By Mr. Chachkes) Okay. Can you tell me

16:10:51 22 just on a high level what this spreadsheet,

16:10:52 23 Exhibit 19, is meant to represent?

16:10:53 24 A. This represents the weight of the sample

16:10:54 25 that was used, it represents the weight of the sample

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1 analyzed per grid opening, it tells you what the
 2 filter size was, it tells you how many regulated
 3 asbestos structures, and then it gives you the
 4 calculation of how many asbestos structures per gram,
 5 which if you're doing weight percent, you have to do
 6 all the same -- get all the same information, but
 7 instead of stopping at the number of structures per
 8 gram, then you go through the calculation to
 9 determine the weight of each of the structures and
 10 then calculate a mass weight percent.

11 Q. Okay. So in Exhibit 19, I guess, on the
 12 upper left I see a .03135. That's the initial weight
 13 prior to concentration method, or is that after
 14 concentration?

15 A. That is the weight prior to the
 16 concentration method.

17 Q. Okay. So that's basically the
 18 unconcentrated weight that you are trying to
 19 determine how many structures are in there?

20 A. Correct.

21 Q. And you use a Sartorius scale; right?

22 A. That's correct.

23 Q. Does it have that many significant digits?

24 A. It does.

25 Q. Okay. Does it have more than that, or is
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16:13:15 1 Q. (By Mr. Chachkes) If you're analyzing two
 16:13:17 2 samples and sample A contains more amphiboles than
 16:13:21 3 sample B, would you expect that following the
 16:13:25 4 concentration there would be more products separated
 16:13:27 5 out from A than B?

16:13:29 6 A. I don't know if you can measure that. If
 16:13:32 7 it contains more amphibole fibers in the final
 16:13:37 8 supernate, then you would have more fibers that you
 16:13:41 9 counted.

16:13:42 10 Q. And by supernate, that's kind of a synonym
 16:13:47 11 for amphibole sludge --

16:13:49 12 A. Well, it's the pellet. Whatever has gone
 16:13:52 13 down to the bottom of the centrifuge tube, any
 16:13:56 14 potential amphiboles, some talc particles, you always
 16:14:00 15 see talc particles, so it's not 100 percent
 16:14:03 16 efficient.

16:14:03 17 Q. The supernate's the solids that are left
 16:14:06 18 over after the concentration?

16:14:07 19 A. Correct.

16:14:08 20 Q. So you can't say that if one sample has
 16:14:10 21 more amphiboles than another that there will be more
 16:14:13 22 supernate in the former than the latter?

16:14:17 23 A. You would expect -- if it has more in
 16:14:19 24 there you would expect more, but it's pretty tough to
 16:14:22 25 make that determination before you measure it.

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16:12:19 1 that it?

16:12:20 2 A. Let's see. One, two, three, four, five.

16:12:24 3 I think it has six.

16:12:26 4 Q. Okay. But you only report five

16:12:29 5 significant digits; correct?

16:12:31 6 A. Correct.

16:12:31 7 Q. And then your analysts conduct heavy

16:12:38 8 liquid density separation; right?

16:12:40 9 A. Correct.

16:12:40 10 Q. After separation you have basically an
 16:12:42 11 amphibole sludge and with much of the talc removed?

16:12:48 12 A. Correct.

16:12:48 13 Q. And what is the percentage of talc from
 16:12:53 14 amphibole separation your analysts achieve in this
 16:12:56 15 analysis?

16:12:57 16 A. We haven't measured that.

16:12:58 17 Q. Do you have the data and just didn't put
 16:13:04 18 it on the sheet, or you just -- you don't even have
 16:13:05 19 the data?

16:13:05 20 A. We don't measure the amount that we
 16:13:07 21 removed.

16:13:08 22 Q. Okay. Is there a way to calculate it?

16:13:12 23 MR. CIRSCH: Object to form.

16:13:13 24 THE WITNESS: Not without making the
 16:13:15 25 measurement, no.

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16:14:24 1 Q. Yeah, I'm not asking you for a
 16:14:26 2 calculation. I'm just saying just seems like common
 16:14:29 3 sense if you've got more to concentrate out, you'll
 16:14:33 4 get more concentrate.

16:14:34 5 MR. CIRSCH: Object to form.

16:14:35 6 THE WITNESS: All things being equal,
 16:14:37 7 that's correct.

16:14:38 8 Q. (By Mr. Chachkes) Okay. After separation
 16:14:38 9 you did not weigh the centrifuge that remained -- you
 16:14:42 10 did not weigh the supernate that remained after
 16:14:48 11 desiccation; correct?

16:14:49 12 A. That's correct.

16:14:50 13 Q. And I see a number, weight of sample
 16:14:56 14 analyzed; do you see that there?

16:14:58 15 A. Correct.

16:14:58 16 Q. That's more significant digits than in the
 16:15:02 17 initial weight; correct?

16:15:06 18 A. That's correct. You take the amount that
 16:15:07 19 has theoretically gone down onto the filter, what you
 16:15:12 20 start with, so that if you have 31.35, then you
 16:15:18 21 calculate what's on the overall filter, and then you
 16:15:20 22 calculate how many grid openings you look at, then
 16:15:23 23 it's just the math.

16:15:24 24 Q. Yeah, now my question is just about
 16:15:25 25 significant digits. You understand why significant

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16:15:28 1 digits are important; right?
 16:15:29 2 A. Yeah, but that's a mathematical
 16:15:33 3 determination of significant digits.
 16:15:34 4 Q. Right. Significant digits are important
 16:15:37 5 because if I have a number with three significant
 16:15:40 6 digits multiplied times a number with four
 16:15:45 7 significant digits, the result should be reflecting
 16:15:51 8 the least number of significant digits that went into
 16:15:53 9 the equation; correct?
 16:15:55 10 MR. CIRSCH: Object to form.
 16:15:56 11 THE WITNESS: You can do it that way if
 16:15:57 12 you like, or you can put it out to the
 16:15:59 13 significant digits and then round it.
 16:16:01 14 Q. (By Mr. Chachkes) Okay. Shouldn't you
 16:16:04 15 have rounded the weight of the sample analyzed
 16:16:06 16 because you've got more significant digits -- you've
 16:16:08 17 got more digits than there are significant digits?
 16:16:10 18 A. No. It's a mathematical -- it's a
 16:16:13 19 mathematical equation or just simply dividing it on
 16:16:18 20 how much of the original sample would cover the
 16:16:21 21 filter.
 16:16:22 22 Q. Okay. You've got a -- I'm going to phrase
 16:16:25 23 this a different way.
 16:16:26 24 You've got a greater precision in your
 16:16:29 25 weight of sample analyzed than you do with the
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16:17:42 1 weight of sample analyzed?
 16:17:44 2 A. Well, you go back to the individual
 16:17:46 3 structures and you multiply the length by the width
 16:17:52 4 squared times the density of the particular type of
 16:17:56 5 amphibole times pi. And then all those are added up,
 16:17:59 6 and then you then go from the adding that up to what
 16:18:03 7 the overall weight would be on the filter.
 16:18:05 8 Q. Okay. And the weight of sample analyzed
 16:18:10 9 is for one grid opening, ten grid openings, 100 grid
 16:18:16 10 openings? What is it?
 16:18:17 11 A. That's, as I believe, that's one grid
 16:18:19 12 opening.
 16:18:19 13 Q. Okay. So if you wanted to extrapolate,
 16:18:25 14 putting aside --
 16:18:26 15 A. I may be wrong on that. I have to check
 16:18:29 16 that. I think it's all 100.
 16:18:30 17 Q. Okay, if that's all 100. Now, that's what
 16:18:37 18 percentage of the total supernate?
 16:18:38 19 A. We haven't measured the total supernate.
 16:18:41 20 We measure what we start with because the
 16:18:43 21 calculations go back to what you start with. We
 16:18:46 22 don't measure the supernate.
 16:18:48 23 Q. What percentage of what you started with
 16:18:50 24 is it?
 16:18:51 25 A. We started with 31 milligrams, and that is
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16:16:31 1 precision of the numbers that went into it?
 16:16:35 2 MR. CIRSCH: Object to form.
 16:16:36 3 THE WITNESS: I don't think it's any more
 16:16:38 4 precision. It's taking the weight and dividing
 16:16:40 5 it onto the filter, and then from the filter
 16:16:43 6 you're looking at a number of area by 100 grid
 16:16:45 7 openings, so you're calculating what the weight
 16:16:48 8 would be if you put the whole -- to go back to
 16:16:52 9 the sample to determine the amount of fibers.
 16:16:55 10 That's just the way it's done.
 16:16:56 11 Q. (By Mr. Chachkes) Does your Sartorius
 16:16:59 12 scale have the capability of measuring a sample down
 16:17:01 13 to .00017187 grams?
 16:17:05 14 A. Not the Sartorius, but we do have a
 16:17:08 15 microbalance, but that's not how this is done.
 16:17:11 16 Q. So the -- this is just a yes or no. The
 16:17:18 17 weight of sample analyzed is a number that is a
 16:17:24 18 calculation; right?
 16:17:26 19 MR. CIRSCH: Object to form.
 16:17:26 20 THE WITNESS: Yes.
 16:17:28 21 Q. (By Mr. Chachkes) Okay. And the
 16:17:29 22 structures per gram of sample, that's also a number
 16:17:31 23 that's calculated; right?
 16:17:34 24 A. That's correct.
 16:17:34 25 Q. And what's the equation to get me the
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16:19:03 1 0.17. Well, we started with 0.3135 grams, and that
 16:19:10 2 is .00017187 grams. So just divide the two.
 16:19:15 3 Q. So is there any need to extrapolate here,
 16:19:22 4 or is 100 percent of the supernate being looked at?
 16:19:26 5 A. You're putting 100 percent of the
 16:19:31 6 supernate down onto the filter.
 16:19:32 7 Q. And that's 100 grid openings?
 16:19:34 8 A. Well, the filter is 201 millimeters
 16:19:38 9 squared. That's the filter where the material is put
 16:19:41 10 through the filter to collect it.
 16:19:43 11 And then you're looking at 100 grid
 16:19:45 12 openings. So 100 grid openings is 1.1 millimeter.
 16:19:50 13 So 1.1 millimeter of the 201 millimeters will now
 16:19:54 14 give you the percentage of what you're looking at on
 16:19:56 15 that filter.
 16:19:57 16 Q. Why are you calculating that percentage?
 16:20:02 17 Isn't 100 percent of what comes through the filter in
 16:20:05 18 the grid openings -- in the 100 grid openings?
 16:20:07 19 MR. CIRSCH: Object to form.
 16:20:08 20 THE WITNESS: No.
 16:20:08 21 Q. (By Mr. Chachkes) Okay.
 16:20:09 22 A. Can I draw on something?
 16:20:11 23 Q. Yeah.
 16:20:13 24 A. The filter is much bigger than 100 grid
 16:20:15 25 openings.

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16:20:16 1 Q. Let me just -- here --
 16:20:18 2 MR. CIRSCH: Here you go.
 16:20:22 3 MR. CHACHKES: That would be great. Thank
 16:20:22 4 you.
 16:20:22 5 THE WITNESS: So if you have a filter
 16:20:23 6 that's this big -- that's not bad -- and then
 16:20:27 7 your grids are 3 millimeters. So -- shall I
 16:20:34 8 make a happy face here?
 16:20:36 9 Q. (By Mr. Chachkes) Please don't.
 16:20:37 10 A. **So each one of these grid openings -- and**
 16:20:46 11 **I'm blowing it up.**
 16:20:50 12 **So you're taking 7 millimeter plugs and**
 16:20:53 13 **then each grid opening has 100 grids that are 100 by**
 16:20:57 14 **100 microns, typically. So the material is going on**
 16:21:01 15 **this whole filter, and then you're just taking**
 16:21:04 16 **sections of the filter out for your TEM grids.**
 16:21:07 17 MR. CHACHKES: I see.
 16:21:08 18 So can we just mark this as an exhibit,
 16:21:12 19 Exhibit 20, please.
 16:21:13 20 (Defendants' Exhibit 20 was marked for
 21 identification.)
 16:21:19 22 THE WITNESS: I didn't know you were going
 16:21:21 23 to mark it.
 16:21:21 24 Q. (By Mr. Chachkes) You did know I was
 16:21:23 25 going to mark it.

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1 A. **That's true.**
 16:21:24 2 Q. So what you've drawn in Exhibit 20 -- so I
 16:21:26 3 just want to get my vocabulary correct -- that the
 16:21:31 4 filter size is the big white circle in which you've
 16:21:33 5 got the three dots, that's the -- thank you for
 16:21:35 6 marking that.
 16:21:35 7 A. **Filter, which is 201 millimeters squared.**
 16:21:41 8 Q. Got it.
 16:21:42 9 A. **And that's the filtration area so you're**
 16:21:46 10 **always -- because it's in a device that holds it,**
 16:21:49 11 **it's not the whole size of the filter, but it's**
 16:21:52 12 **actually the area where filtrate is going down**
 16:21:55 13 **through it.**

16:21:56 14 Q. Right. Okay.
 16:21:56 15 MR. CIRSCH: You're pulling those numbers
 16:21:57 16 from Exhibit 19; correct?

16:21:59 17 THE WITNESS: Yes. It's the same size for
 16:22:00 18 every one.

16:22:01 19 MR. CHACHKES: And if you would not
 16:22:03 20 comment.

16:22:04 21 Q. (By Mr. Chachkes) And the black dots that
 16:22:05 22 you have there, those are the grid openings?
 16:22:08 23 A. **Those are the grids.**
 16:22:09 24 Q. Okay.
 16:22:09 25 A. **So a grid -- and this has been blown up --**

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16:22:17 1 **is approximately 3 millimeters in diameter. Now, on**
 16:22:23 2 **this grid are openings.**
 3 Q. Okay.
 16:22:24 4 A. **And each one of these openings looks like**
 16:22:35 5 **this, and they are 100 micrometers in width in two**
 16:22:47 6 **directions. So when you look at a grid opening,**
 16:22:49 7 **you're looking in this area.**
 16:22:51 8 Q. Okay. And I apologize for repeating it a
 16:22:56 9 little bit, but the -- just want to make sure the
 16:22:59 10 transcript's clear to correspond with the picture.
 16:23:02 11 You've got drawn, it looks like a circle
 16:23:06 12 with three black dots, that's the filter, and in the
 16:23:09 13 filter there are -- those black dots are grids;
 16:23:12 14 correct? So far correct?
 16:23:13 15 A. **So far correct.**
 16:23:14 16 Q. Okay. And how many grids -- I know your
 16:23:17 17 picture only has three, but how many grids are
 16:23:20 18 actually in your filter in the lab?
 16:23:22 19 A. **We make three grids.**
 16:23:24 20 Q. Oh, so there are three grids?
 16:23:26 21 A. **Correct.**
 16:23:27 22 Q. And then you've drawn a couple arrows to
 16:23:29 23 emphasize what the grid is, and the grid has got
 16:23:32 24 basically a bunch of grid openings and that's 100
 16:23:34 25 grid openings?

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16:23:35 1 A. **Correct.**
 16:23:36 2 Q. Okay. And each grid opening is, you said,
 16:23:39 3 10 micrometers?
 16:23:40 4 A. **100 micrometers.**
 16:23:41 5 Q. 100 micrometers. Got it.
 16:23:43 6 A. **100 micrometers, essentially a square, 100**
 16:23:49 7 **micrometers for each XY dimension.**
 16:23:51 8 Q. Okay. And when you extrapolate filters --
 16:23:59 9 if the fibers you find in the filters back to the
 16:24:03 10 original weight of the sample, can you just walk me
 16:24:06 11 through that in conceptual terms?
 16:24:08 12 A. **In conceptual terms, you know the area**
 16:24:12 13 **you've analyzed by the grid openings. You know the**
 16:24:15 14 **area of your filter, and you take the -- you**
 16:24:20 15 **determine the ratio of the amount of material on the**
 16:24:25 16 **filter and then go to the amount of material that**
 16:24:28 17 **would be on each grid opening, and then you take the**
 16:24:32 18 **number of fibers you have and then you**
 16:24:36 19 **back-calculate.**
 16:24:36 20 So if I have three fibers in a known
 16:24:39 21 amount, and that amount is some percentage of the
 16:24:43 22 overall amount that I know that in the overall amount
 16:24:46 23 on the filter, this is how many fibers and bundles
 16:24:52 24 would be there because you have to assume a
 16:24:56 25 homogenous distribution on the filter.

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16:24:58 1 Q. And do you look at the -- for your fiber
 16:25:05 2 count, do you look at each of the three grids?
 16:25:08 3 A. **We keep one for archive; we look at two**
 16:25:11 4 **grids and 50 openings on each grid.**
 16:25:13 5 Q. Okay. And why only 50 openings on each
 16:25:18 6 grid?
 16:25:18 7 A. **Well, typically the standard protocols,**
 16:25:23 8 **the peer-reviewed protocols, usually state two grid**
 16:25:28 9 **openings -- two grids, and so we put 50 on one and 50**
 16:25:33 10 **on the other.**
 16:25:34 11 Q. Why not 100 on one and 100 on the other?
 16:25:37 12 A. **Well, that would take twice as much time.**
 16:25:40 13 **And you could do that, or you could look at 300. It**
 16:25:45 14 **doesn't change anything other than reduce your --**
 16:25:48 15 **increase your analytical sensitivity.**
 16:25:50 16 Q. Okay. Does the ISO 22262-2 lay out this
 16:26:00 17 math for extrapolating from looking at a grid?
 16:26:05 18 A. **No. It referenced the protocols. All TEM**
 16:26:11 19 **analyses -- air sample, water sample, bulk sample --**
 16:26:15 20 **is done in this manner. All analytical chemistry is**
 16:26:19 21 **done in this manner.**
 16:26:20 22 **If you take a gallon of water out of Lake**
 16:26:24 23 **Michigan and you want to determine the amount of lead**
 16:26:26 24 **in there, for example, hypothetical, you don't**
 16:26:28 25 **measure the whole gallon, you measure, typically, a**
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16:27:55 1 morphologically as asbestos; is that correct?
 16:27:58 2 MR. CIRSCH: Object to form.
 16:27:59 3 THE WITNESS: They use TEM to identify
 16:28:01 4 regulated asbestos using morphology, EDXA and
 16:28:08 5 SAED.
 16:28:09 6 Q. (By Mr. Chachkes) Okay. So is there a
 16:28:10 7 phrase that I can use that's not confusing to refer
 16:28:12 8 to the visual aspect of TEM that's not, you know,
 16:28:16 9 SAED or the other more different techniques?
 16:28:19 10 A. **Well, if you say all the counting rules**
 16:28:21 11 **for all the standard TEM methods that is not the**
 16:28:26 12 **occupational exposure counting rules, they will all**
 16:28:30 13 **state the same thing.**
 16:28:31 14 Q. No, I'm just looking for a -- I want to
 16:28:33 15 make sure we're speaking a common language, the
 16:28:36 16 visual --
 16:28:37 17 A. **How about just counting rules?**
 16:28:38 18 Q. Well, we disagree as to what the counting
 16:28:40 19 rules require.
 16:28:41 20 So if I say the visual aspect of TEM as
 16:28:46 21 opposed to the SAED and -- what do you call it when
 16:28:57 22 you take a picture with the TEM?
 16:28:59 23 MR. CIRSCH: Object to form.
 16:29:00 24 THE WITNESS: Photomicrograph.
 16:29:01 25 Q. (By Mr. Chachkes) Okay. So they use
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16:26:32 1 **couple of milliliters of the material and then you**
 16:26:34 2 **extrapolate back on the overall concentration that**
 16:26:37 3 **would be there.**
 16:26:38 4 **The ISO TEM air sample method is the same**
 16:26:40 5 **way. You're analyzing it and you find 4 or 5 fibers**
 16:26:46 6 **in the grid opening, you're extrapolating back to**
 16:26:49 7 **what is in the air samples.**
 16:26:51 8 Q. Okay. Now, when you said the
 16:26:57 9 peer-reviewed literature suggests looking at two of
 16:27:00 10 the grids, can you give me an example of some such
 16:27:05 11 literature?
 16:27:05 12 A. **Well, there's lots of peer-reviewed**
 16:27:07 13 **literature that used the standard protocols. If you**
 16:27:09 14 **look at the AHERA, you look at ISO, you look at the**
 16:27:12 15 **NIOSH 7402, you look at the PCM, anything that has to**
 16:27:18 16 **do with TEM, you have two grid openings. The 7402**
 16:27:23 17 **says 40 openings among two grids.**
 16:27:28 18 **If you have a high number of fibers, then**
 16:27:31 19 **you may stop on your second opening on one grid and**
 16:27:34 20 **then go to the second grid. So the protocols**
 16:27:38 21 **themselves state that.**
 16:27:39 22 Q. Okay. Your analysts employed ISO 22262-2
 16:27:44 23 to test for asbestos by TEM; is that correct?
 16:27:46 24 A. **Yes.**
 16:27:47 25 Q. And they use TEM to identify the particles
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16:29:02 1 photomicrographs to determine -- from the TEM to
 16:29:05 2 determine morphology?
 16:29:06 3 A. **No. They use the counting rules to**
 16:29:08 4 **determine morphology, that it has parallel sides,**
 16:29:12 5 **it's greater than .5 micrometers in length, it has at**
 16:29:15 6 **least a 5-to-1 aspect ratio, and the chemistry in**
 16:29:20 7 **SAED determines it to be a regulated asbestos, then**
 16:29:23 8 **it's a regulated asbestos fiber.**
 16:29:25 9 Q. I didn't ask what you look at to determine
 16:29:28 10 whether it's asbestos or not.
 16:29:29 11 What do you -- what physically are you
 16:29:33 12 looking at to determine morphology? It's the
 16:29:35 13 photomicrograph; right?
 16:29:37 14 MR. CIRSCH: Object to form.
 16:29:37 15 THE WITNESS: No. We're visually looking
 16:29:40 16 through the microscope. And I'll use an
 16:29:42 17 example. I'm looking at a magnification of
 16:29:46 18 approximately 20,000 times, and in my field of
 16:29:49 19 view a structure looking like this pen shows up.
 16:29:55 20 The first thing I do is look at it and say
 16:29:57 21 does it have parallel sides? The answer is yes.
 16:30:00 22 We have calibration standards and go is it
 16:30:03 23 greater than .5 micrometers in length? Yes.
 16:30:06 24 Does it have an aspect ratio of greater than
 16:30:11 25 5-to-1? I can visually see that, but we take a
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16:30:14 1 photomicrograph -- it's close -- to make sure.
 16:30:16 2 Q. (By Mr. Chachkes) So you use visual
 16:30:18 3 inspection through the TEM to determine morphology?
 16:30:22 4 MR. CIRSCH: Object to form.
 16:30:23 5 THE WITNESS: With the counting rules,
 16:30:26 6 that is correct.
 16:30:27 7 Q. (By Mr. Chachkes) Okay. Well, it doesn't
 16:30:29 8 matter what the counting rules are. If you want to
 16:30:32 9 look at -- if you want to just see the morphology,
 16:30:34 10 you use visual inspection?
 16:30:36 11 MR. CIRSCH: Object to form.
 16:30:36 12 THE WITNESS: The first thing we do is
 16:30:38 13 look at it and if it has parallel sides and does
 16:30:42 14 it meet the counting rules where this is an
 16:30:47 15 elongated particle, that deserves further
 16:30:51 16 examination.
 16:30:51 17 Q. (By Mr. Chachkes) Can you tell me where
 16:30:53 18 in ISO 22262 it provides -- directs you to look at
 16:31:01 19 morphology under TEM?
 16:31:03 20 A. I did. I gave you the ISO standard for
 16:31:06 21 TEM and indirect prep, and in order to determine what
 16:31:11 22 your weight percent is, you have to determine if it
 16:31:14 23 is parallel sides, greater than .5 micrometers in
 16:31:17 24 length, and so on and so forth.
 16:31:19 25 Not all methods replicate previous

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16:31:22 1 methods. ISO 22262-2 does not put the entire
 16:31:28 2 counting protocol in there. It directs you to the
 16:31:30 3 TEM method where you have all these methodology to do
 16:31:36 4 that.
 16:31:36 5 Q. Okay. So it's not, per se, in 22262, but
 16:31:40 6 you're saying there's a reference to another ISO
 16:31:44 7 standard which you say requires visual inspection
 16:31:49 8 under TEM to determine morphology?
 16:31:52 9 MR. CIRSCH: Object to form.
 16:31:53 10 THE WITNESS: Well, per se it doesn't
 16:31:55 11 replicate the entire procedure. That's how
 16:31:57 12 these standards work.
 16:31:59 13 Once it has a document, in this case,
 16:32:03 14 another ISO document that lays out all the
 16:32:06 15 procedures and practices for how to identify
 16:32:09 16 regulated asbestos, it just goes back to that.
 16:32:13 17 Q. (By Mr. Chachkes) So --
 16:32:14 18 A. ASTM is the same way, and the definition
 16:32:17 19 of asbestos fibers in ASTM has another document that
 16:32:20 20 tells you all the different definitions. One builds
 16:32:25 21 on the other.
 16:32:26 22 Q. Okay. Just looking at 22262, there is a
 16:32:28 23 section in there under part 1 that is labeled
 16:32:33 24 Morphology; right?
 16:32:47 25 Exhibit 4 is the one that's part 1?

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16:32:49 1 A. Oh, part 1, I'm sorry.
 16:32:51 2 Q. Yeah. I'll just direct your attention to
 16:33:05 3 7.2. -- on page 22.
 16:33:22 4 So there's a section on page 22 which has
 16:33:26 5 the heading Morphology; correct?
 16:33:28 6 A. That is correct. 7.2.3.7.1. I'm
 16:33:32 7 surprised you didn't know that.
 16:33:34 8 Q. I did, actually.
 16:33:36 9 And the only heading, as far as you know,
 16:33:41 10 in the ISO 22262 parts that actually says morphology
 16:33:47 11 is this one? Or do you not know? I don't want to
 16:33:51 12 spend all day on that one.
 16:33:52 13 MR. CIRSCH: Form.
 16:33:53 14 THE WITNESS: Well, this is a PLM
 16:33:54 15 analysis. This is not TEM analysis. And ISO
 16:33:56 16 has their PLM analysis setup, and these are the
 16:34:01 17 counting rules of what you do when you're
 16:34:03 18 analyzing under a polarized light microscope
 16:34:05 19 versus a transmission electron microscope.
 16:34:07 20 Q. (By Mr. Chachkes) Did you use PLM to
 16:34:12 21 identify the morphology of the fibers you found in
 16:34:15 22 the MDL?
 16:34:16 23 MR. CIRSCH: Object to form.
 16:34:19 24 THE WITNESS: Well, that's worded -- and I
 16:34:20 25 apologize. That's worded poorly.

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16:34:22 1 For our ISO 22262-1 PLM analysis, yes. We
 16:34:28 2 went through, and each of these regulated
 16:34:32 3 asbestos fibers that we have in there in
 16:34:34 4 pictures follow this morphology.
 16:34:37 5 Q. (By Mr. Chachkes) Okay. In your reports
 16:34:43 6 you write on page 12, Amphibole fibers or bundles
 16:34:49 7 with substantially parallel sides and an aspect ratio
 16:34:53 8 of 5-to-1 or greater and at least half a micrometer
 16:34:56 9 in length were counted as regulated asbestos fibers
 16:35:00 10 and bundles per the standard TEM counting rules
 16:35:03 11 described by -- and then you cite six methods. Are
 16:35:07 12 you with me so far?
 16:35:08 13 A. I am.
 16:35:08 14 Q. Which is the method you actually use?
 16:35:12 15 A. Well, can't really point to any one method
 16:35:15 16 because they all have the same counting rules.
 16:35:17 17 Q. Okay.
 16:35:27 18 A. What page was that?
 16:35:28 19 Q. I was just talking about page 12 of your
 16:35:31 20 January 15.
 16:35:32 21 A. I think it states that.
 16:35:35 22 This is for, again, TEM. And every one of
 16:35:45 23 those TEM methods have those counting rules, so I
 16:35:48 24 referenced them all.
 16:35:50 25 MR. CHACHKES: So I'm going to mark as the

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16:35:51 1 next exhibit ISO 13794. We are on Exhibit 21.

16:36:02 2 (Defendants' Exhibit 21 was marked for
16:36:25 3 identification.)

16:36:25 4 Q. (By Mr. Chachkes) So we spoke a little
16:36:26 5 bit before about what's been marked as Exhibit 21;
6 right?

16:36:31 7 A. Yes, sir, we have.

16:36:32 8 Q. Okay. And going to the seventh page in
16:36:41 9 section 1, Scope. Section -- we're here.

16:36:55 10 A. What page? 7? Did you say 7?

16:36:59 11 Q. Actually, strike that.

16:37:00 12 I'm sorry. So it was the seventh page of
16:37:05 13 the PDF, so let's strike that and start again.

16:37:09 14 Going to what's numbered in the exhibit as
16:37:11 15 page 1, going to the heading 1, this is Scope; right?

16:37:17 16 It's the scope of the ISO standard?

16:37:19 17 A. Correct.

16:37:20 18 Q. Okay. Subsection 1.1, which is substance
16:37:24 19 determined; do you see that?

16:37:25 20 A. I do.

16:37:26 21 Q. And then you see at the last sentence, The
16:37:30 22 method cannot discriminate between individual fibers
16:37:33 23 of asbestos and nonasbestos analogs of the same
16:37:36 24 amphibole mineral.

16:37:36 25 Do you see that?

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16:37:37 1 A. I do.

16:37:37 2 Q. Do you agree with ISO 13794 that this
16:37:43 3 method cannot discriminate between individual fibers
16:37:46 4 of the asbestos and nonasbestos analogs of the same
16:37:50 5 amphibole material?

16:37:50 6 A. Yes and no. If you're analyzing samples
16:37:56 7 over and over from the same source and you're seeing
16:38:01 8 both what people will clearly say is asbestiform
16:38:08 9 bundles and you have some individual fibers in there,
16:38:11 10 in my opinion you can discriminate against that.

16:38:12 11 If I was looking at one fiber and I didn't
16:38:15 12 have any information about it and hadn't analyzed
16:38:18 13 sample after sample, I would say that one fiber, it's
16:38:24 14 asbestos, it's asbestiform because it's formed like
16:38:28 15 asbestos, but, no, it does not meet the geological
16:38:31 16 definition for asbestos, high tensile strength,
16:38:36 17 flexible, and so on and so forth.

16:38:39 18 But to me, asbestiform means that it is
16:38:42 19 fibrous like asbestos; I would call it asbestiform.

16:38:45 20 Q. So it's your understanding when -- in this
16:38:49 21 exhibit, in this ISO standard, when it says it can't
16:38:52 22 discriminate between asbestos and nonasbestos
16:38:54 23 analogs, it's referring to geological definitions and
16:39:00 24 not regulatory definitions; is that your testimony?

16:39:02 25 MR. CIRSCH: Object to form.

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16:39:03 1 THE WITNESS: Well, it is regulatory. If

16:39:05 2 it -- even though it cannot discriminate, you
16:39:07 3 have to count it, and it is a regulated asbestos
16:39:10 4 fiber if you decide it's asbestiform or not. It
16:39:14 5 does not allow you to discriminate between the
16:39:16 6 two as long as it meets the counting rules. It
16:39:18 7 is regulated.

16:39:19 8 Q. (By Mr. Chachkes) Okay.

16:39:21 9 A. Now, we can argue over back and forth if
16:39:24 10 it is asbestiform or not. But make no mistake, it is
16:39:27 11 a regulated asbestos fiber if it meets the counting
16:39:28 12 rules.

16:39:28 13 Q. Okay. So you're saying that something can
16:39:31 14 meet the counting rules, be regulated, but it might
16:39:34 15 be the non -- you might be counting nonasbestos
16:39:37 16 analogs?

16:39:38 17 MR. CIRSCH: Object to form.

16:39:39 18 THE WITNESS: It's not nonasbestos.

16:39:42 19 It's --

16:39:42 20 Q. (By Mr. Chachkes) I'm using the phrase
16:39:44 21 in --
16:39:44 22 A. It is not nonasbestos. If it meets all
16:39:46 23 the counting rules, it's a regulated asbestos fiber.
16:39:49 24 That's my position on that.

16:39:50 25 Q. Okay. In this last sentence of 1.1, it

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16:39:55 1 makes a distinction between asbestos and nonasbestos
16:39:57 2 analogs; do you see that?

16:39:58 3 A. I see that.

16:39:59 4 Q. That's black and white; right?

16:40:00 5 MR. CIRSCH: Object.

16:40:01 6 THE WITNESS: That's what it states.

16:40:02 7 Q. (By Mr. Chachkes) Okay. So tell me what
16:40:04 8 asbestos versus nonasbestos analogs mean in
16:40:09 9 ISO 13794.

16:40:09 10 MR. CIRSCH: Object to form.

16:40:10 11 THE WITNESS: They don't really define it
16:40:12 12 other than to say it may not.

16:40:13 13 In my opinion, if it is fibrous,

16:40:16 14 asbestiform, fibrous like asbestos-form, it is
16:40:20 15 asbestiform.

16:40:21 16 Q. (By Mr. Chachkes) Yeah, but what I want
16:40:23 17 is can you make any -- reading -- looking at that
16:40:27 18 sentence, there's a clear distinction between
16:40:30 19 asbestos and nonasbestos analogs. What's the
16:40:32 20 difference?

16:40:33 21 It doesn't matter what you think. What is
16:40:34 22 the ISO -- what distinction are they making? Or you
16:40:37 23 just can't say?

16:40:38 24 MR. CIRSCH: Object to form.

16:40:38 25 THE WITNESS: It's not that they don't

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16:40:40 1 say. They don't tell you how to determine
 16:40:41 2 between, quote, this nonasbestos -- this
 16:40:44 3 nonasbestiform versus asbestosiform. There is no
 16:40:50 4 method for doing that.
 16:40:52 5 Q. (By Mr. Chachkes) Okay. Is it your
 16:40:53 6 opinion because they don't give a definition of the
 16:40:56 7 distinction, they really didn't mean that
 16:40:59 8 distinction?

16:40:59 9 **A. I can't say what the --**

16:41:01 10 MR. CIRSCH: Object to form.

16:41:02 11 THE WITNESS: -- what Eric Chatfield had
 16:41:05 12 in mind when he said that.

16:41:07 13 Q. (By Mr. Chachkes) Okay.

16:41:09 14 **A. But in the protocol, what I look at as a**
 16:41:13 15 **scientist, and we look at these protocols, what does**
 16:41:17 16 **it say to make the determination between the two? It**
 16:41:19 17 **doesn't give you any information. Same thing with**
 16:41:23 18 **the whole asbestosiform, high tensile strength,**
 16:41:24 19 **et cetera.**

16:41:24 20 **But we have the ability now, we have**
 16:41:26 21 **analyzed so many samples and have analyzed so many**
 16:41:30 22 **regulated asbestos fibers and bundles that we have**
 16:41:34 23 **enough information if that is really at issue that**
 16:41:37 24 **these are all asbestosiform.**

16:41:40 25 **But no matter if you want to argue that**

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16:42:39 1 counted and what doesn't get counted, what does
 16:42:41 2 nonasbestos analogs in this sentence mean? What does
 16:42:45 3 that phrase mean?

16:42:46 4 MR. CIRSCH: Object to form. And this is
 16:42:48 5 the last time he's going to answer this
 16:42:51 6 question.

16:42:51 7 THE WITNESS: I don't know what they're
 16:42:52 8 saying what it means because they don't give you
 16:42:54 9 any information to make that determination.

16:42:56 10 I look at just simply what does
 16:42:58 11 asbestosiform mean. It means formed like
 16:43:01 12 asbestos.

16:43:02 13 So you may not like my opinion, but that's
 16:43:06 14 my opinion.

16:43:06 15 Q. (By Mr. Chachkes) You know that under 2.6
 16:43:13 16 on page 2 it says, Asbestiform is a specific type of
 16:43:17 17 mineral fibrosity in which fibers and fibrils possess
 16:43:21 18 high tensile strength and flexibility.

16:43:24 19 You see that; right?

16:43:25 20 A. **What is it? 2.6?**

16:43:27 21 Q. 2.6. Do you see that?

16:43:27 22 A. **Yes, I do.**

16:43:27 23 Q. Would it be reasonable to conclude
 16:43:29 24 nonasbestiform is something that is an analog to
 16:43:33 25 something that is asbestosiform under 2.6?

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16:41:42 1 **it's not, it is, for single fibers, it's all**
 16:41:45 2 **regulated asbestos fibers per these protocols.**
 16:41:47 3 Q. Yeah, you've already said that a number of
 16:41:49 4 times, and I'm not going to take issue with your
 16:41:51 5 opinion in that regard.

16:41:52 6 What I want to know is the phrase
 16:41:56 7 nonasbestos analog appears in ISO 13794. What does
 16:42:00 8 it mean? And if you have no idea, that's fine.

16:42:03 9 MR. CIRSCH: Object to form.

16:42:04 10 THE WITNESS: It's not that I don't have
 16:42:05 11 any idea. I have an opinion about it. And it's
 16:42:08 12 not my opinion that they're regulated asbestos
 16:42:10 13 or not and you count them. The protocol tells
 16:42:13 14 you to count them, that this is a regulated
 16:42:16 15 asbestos fiber, you will record it on a count
 16:42:19 16 sheet. All these protocols do that.

16:42:21 17 It doesn't give you the information to
 16:42:22 18 make the determination. Just like it doesn't
 16:42:24 19 give you the information to determine if you
 16:42:26 20 have high tensile strength. It does not give
 16:42:30 21 you the information to make the determination
 16:42:31 22 what a population is. It does not give you the
 16:42:34 23 information to make a determination if it's
 16:42:37 24 flexible or not.

16:42:37 25 Q. (By Mr. Chachkes) Putting aside what gets

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16:43:35 1 **A. No.**
 16:43:35 2 MR. CIRSCH: Object to form.
 16:43:36 3 THE WITNESS: The protocol doesn't tell
 16:43:38 4 you what any of that means. High tensile
 16:43:41 5 strength. What tensile strength? How do you
 16:43:45 6 measure that?

16:43:46 7 That's just a general geological
 16:43:48 8 definition for somebody who may be interested in
 16:43:51 9 digging asbestos out of the ground, and is it
 16:43:53 10 going to be fibrous enough to be profitable?

16:43:56 11 That has no meaning in the protocol.
 16:43:57 12 Otherwise, in a protocol for how to do the
 16:44:00 13 analysis, how do you determine it's high tensile
 16:44:03 14 strength? What does high tensile strength mean?
 16:44:06 15 Is it 10,000 high, is it 2,000 high has no
 16:44:11 16 bearing on the actual analysis in the protocol.

16:44:13 17 Q. (By Mr. Chachkes) Okay.
 16:44:16 18 A. **This is nothing more than a standard**
 16:44:16 19 **geological definition for a high fibrous mine of**
 16:44:20 20 **asbestos.**

16:44:20 21 Q. In your opinion, is the sentence that this
 16:44:24 22 method -- this ISO method can't discriminate between
 16:44:28 23 individual fibers of asbestos and nonasbestiform
 16:44:31 24 analogs, is it related to those definitions in 2.6,
 16:44:35 25 2.7?

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16:44:36 1 A. No, because those definitions aren't
16:44:39 2 defined anywhere in the protocol for the analysis.

16:44:42 3 Q. Okay. And so when ISO uses the word
16:44:45 4 asbestos on page 1, it's not related to how ISO
16:44:49 5 defines asbestos on page 2?

16:44:52 6 MR. CIRSCH: Object to form.

16:44:53 7 THE WITNESS: On page 2, if you go to
16:45:02 8 page 3, they define what a fiber is.

16:45:08 9 Is it page 3 or page 4? Give me a second.

16:45:17 10 ISO defines a fiber -- for the purpose of
16:45:20 11 this International Standard, a fiber is defined
16:45:23 12 to have an aspect ratio equal or greater than
16:45:26 13 5-to-1 and a minimum length of 5.0.

16:45:29 14 Fiber bundle, structure composed of
16:45:31 15 parallel smaller diameter fibers attached to
16:45:35 16 longer lengths.

16:45:36 17 Fibrous structure.

16:45:38 18 And then you go to, okay, once I've
16:45:40 19 defined it as a fiber, in the method tells you
16:45:43 20 to -- how to identify it if it is asbestos fiber
16:45:46 21 or not.

16:45:48 22 Nothing else in there tells you anything
16:45:49 23 about how to determine tensile strength, how to
16:45:52 24 determine flexibility, how to determine the
16:45:56 25 pop -- this one doesn't say population, but some

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16:46:58 1 make the determination other than the counting
16:47:00 2 rules.

16:47:01 3 Certainly, if it doesn't have parallel
16:47:04 4 sides, if it is a piece of a chunk of rock,
16:47:08 5 yeah, that's nonasbestiform. But when it has
16:47:10 6 the definition and meets the regulatory fiber
16:47:14 7 definition for asbestos, it is asbestos.

16:47:17 8 Q. (By Mr. Chachkes) Okay. But you agree
16:47:19 9 with the sentence in -- all right. Strike that.

16:47:36 10 You personally can distinguish between
16:47:40 11 asbestos and nonasbestos analogs with TEM; is that
16:47:44 12 correct?

16:47:44 13 MR. CIRSCH: Object to form.

16:47:45 14 THE WITNESS: Yes, I can.

16:47:49 15 Q. (By Mr. Chachkes) Using the ISO 13794
16:47:54 16 method; correct?

16:47:56 17 A. Yes, I can. If it doesn't meet the
16:47:57 18 counting rules, it doesn't have parallel sides, it
16:48:01 19 doesn't have the aspect ratio, I don't record that as
16:48:05 20 an asbestos -- as an asbestos -- regulated asbestos
16:48:09 21 fiber.

16:48:11 22 Outside those counting rules, there's
16:48:12 23 nothing else in there. If it has parallel sides --
16:48:18 24 and what we're arguing is a small number of fibers.
16:48:22 25 I think in the MDL we had almost 90-something percent

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16:45:59 1 do.

16:45:59 2 Q. (By Mr. Chachkes) It's a simple -- very
16:46:01 3 simple question. Page 1, the word asbestos is used.
16:46:04 4 On page 2 I see a definition of asbestos. Is it your
16:46:07 5 testimony that the two are unrelated, or are they
16:46:10 6 related?

16:46:14 7 MR. CIRSCH: Object to form.

16:46:11 8 Q. (By Mr. Chachkes) It's a yes or no. Are
16:46:13 9 they related?

16:46:14 10 MR. CIRSCH: Object to form.

16:46:14 11 THE WITNESS: This is not a yes and no
16:46:16 12 question. You have to take the whole protocol
16:46:18 13 into consideration to answer this question.

16:46:21 14 The whole protocol determines what is a
16:46:24 15 regulated asbestos, and then the asbestiform and
16:46:27 16 high tensile strength is just a general
16:46:30 17 definition. That's what it means.

16:46:32 18 Q. (By Mr. Chachkes) Okay. So if I want to
16:46:36 19 figure out what nonasbestos analog means in 1.1, I
16:46:41 20 could not use definitions like 2.6, 2.7, 2.8 to help
16:46:46 21 me determine that?

16:46:48 22 MR. CIRSCH: Object to form.

16:46:49 23 THE WITNESS: Well, those definitions tell
16:46:51 24 you what is a regulated asbestos fiber. There
16:46:55 25 is nothing in the protocol that tells you how to

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16:48:25 1 bundles.

16:48:25 2 So then we're dealing with some single
16:48:29 3 fibers. And because we have this -- and I'll call
16:48:34 4 it -- since a population is more than one, for these
16:48:37 5 two mine sources we're dealing with, we have a large
16:48:40 6 number of asbestiform bundles and a much smaller
16:48:44 7 number of individual fibers.

16:48:45 8 Q. Would you agree that there are two types
16:48:47 9 of tremolite --

16:48:48 10 MR. CIRSCH: Did you finish your answer,
16:48:49 11 Dr. Longo?

16:48:49 12 THE WITNESS: I think so.

16:48:50 13 Q. (By Mr. Chachkes) Would you agree that
16:48:51 14 there's two kinds of tremolite: asbestiform and
16:48:54 15 nonasbestiform?

16:48:55 16 A. I agree there's tremolite asbestos; and
16:48:57 17 then there's tremolite asbestos, regulated tremolite
16:49:01 18 asbestos. Then there is what we don't count as a
16:49:04 19 regulated asbestos fiber because of various reasons.

16:49:07 20 Q. Is there such a thing as nonasbestiform
16:49:11 21 tremolite?

16:49:12 22 A. There is cleavage fragment type small
16:49:16 23 particulates of tremolite that we do not count. You
16:49:18 24 can call it nonasbestiform; you can call it a
16:49:20 25 cleavage fragment. But I would agree with that.

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16:49:23 1 **Anything below 5-to-1 aspect ratio we don't count.**
 16:49:27 2 **And you can call it whatever you like, but it's not a
 16:49:30 3 regulated asbestos fiber/bundle.**

16:49:32 4 Q. Okay. Do you ever -- do you feel like you
 16:49:39 5 have the ability to talk about a mineralogical --
 16:49:42 6 what you called a mineralogical definition of
 16:49:44 7 asbestos? Or is that outside of your expertise?

16:49:47 8 **A. You mean a geological definition?**

16:49:49 9 Q. Or a geological.

16:49:50 10 A. **Sure.**

16:49:50 11 Q. Okay. Geologically, what's a
 16:49:52 12 nonasbestiform asbestos?

16:49:53 13 A. **Rocks.**

16:49:56 14 Q. That's it? Everything that's rock is
 16:49:59 15 nonasbestiform asbestos?

16:50:01 16 MR. CIRSCH: Object to form.

16:50:02 17 THE WITNESS: If it doesn't have a fibrous
 16:50:04 18 habitat, it's nonasbestos.

16:50:07 19 Q. (By Mr. Chachkes) Okay.

16:50:08 20 A. **Or habit -- excuse me -- not habitat. I
 16:50:10 21 think that's where animals live. I apologize.
 16:50:12 22 Strike that.**

16:50:12 23 **If the crystalline habit is not fibrous,
 16:50:17 24 then it's not something that is mined or used as a
 16:50:22 25 regulated -- and it's not determined to be a**

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16:51:24 1 mine has shown that the tremolite in there is
 16:51:27 2 primarily asbestosiform, then, yeah, you can take
 16:51:30 3 all the data specifically and say, well, this
 16:51:34 4 whole data with XRD shows that there was
 16:51:37 5 tremolite present, but no, it doesn't -- XRD
 16:51:39 6 does not give you fibrous. But after a while,
 16:51:43 7 if you analyze enough samples out of the mine
 16:51:45 8 and you're seeing regulated asbestos fibers and
 16:51:47 9 bundles, then more likely than not those initial
 16:51:51 10 XRD analysis was asbestos.

16:51:53 11 Q. (By Mr. Chachkes) Without referring to
 16:51:55 12 the -- so you understand that I can look at a tree in
 16:52:00 13 many different ways. I can look at it through a
 16:52:02 14 microscope, I can look at it through a telescope, I
 16:52:05 15 can look at it with my own eyes. So far you're with
 16:52:08 16 me?

16:52:08 17 A. **So far.**

16:52:09 18 Q. Okay. Do you understand that the way I
 16:52:10 19 look at it doesn't change the definition of whether
 16:52:12 20 it's a tree or not; right?

16:52:14 21 MR. CIRSCH: Object to form.

16:52:15 22 Q. (By Mr. Chachkes) Is that true or not?

16:52:16 23 MR. CIRSCH: Object to form.

16:52:17 24 Q. (By Mr. Chachkes) I'm only asking about
 16:52:20 25 the tree now.

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16:50:24 1 **regulated asbestos.**

16:50:24 2 Q. All right. You remember the original
 16:50:26 3 question was not about regulations; it was about the
 16:50:28 4 geological definitions; right?

16:50:31 5 MR. CIRSCH: Object to form.

16:50:32 6 THE WITNESS: I believe I have enough
 16:50:33 7 expertise to discuss the geological definitions,
 16:50:36 8 to discuss this high tensile strength, to
 16:50:40 9 discuss what the value of a mine is that has
 16:50:42 10 very matted, very fibrous asbestos, like
 16:50:45 11 chrysotile, versus what a ton of the same
 16:50:49 12 asbestos where it's 7M and it's almost two
 16:50:54 13 orders of magnitude difference. It's about the
 16:50:56 14 viability of a particular asbestos mine.

16:50:58 15 Q. (By Mr. Chachkes) Okay. Tremolite alone
 16:51:02 16 does not mean it's asbestos; would you agree with
 16:51:04 17 that statement --

16:51:09 18 MS. O'DELL: Object to form.

16:51:10 19 Q. (By Mr. Chachkes) -- saying something's
 16:51:11 20 tremolite?

16:51:12 21 MS. O'DELL: Object to form.

16:51:10 22 THE WITNESS: It depends on what you're
 16:51:11 23 talking about. If you're talking about, say,
 16:51:14 24 XRD 20, 30, 40 years ago, said tremolite in a
 16:51:20 25 particular mine and over time that particular

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16:52:21 1 A. **I don't think you would be able to tell by
 16:52:24 2 a telescope. But if you're looking at a tree, it's a
 16:52:27 3 tree.**

16:52:27 4 Q. Right. It doesn't matter how I'm looking
 16:52:29 5 at it. A tree is a tree; is that correct?

16:52:32 6 MS. O'DELL: Object to form.

16:52:33 7 THE WITNESS: Your tree analogy for a
 16:52:36 8 tree, that's correct.

16:52:36 9 Q. (By Mr. Chachkes) Okay. So are you
 16:52:38 10 saying it's different for asbestos? I call something
 16:52:41 11 asbestos or nonasbestiform depending on how I look at
 16:52:44 12 it?

16:52:44 13 MR. CIRSCH: Object to form.

16:52:45 14 THE WITNESS: No. It's sort of a
 16:52:46 15 misleading kind of analogy.

16:52:48 16 What I'm talking about is back 50 years
 16:52:53 17 ago, when you're looking at a tree, you said it
 16:52:56 18 was a tree. Somebody asked later that -- people
 16:52:59 19 went in who actually knew what trees were and
 16:53:02 20 said, well, 95 percent of these are oak trees 40
 16:53:05 21 years later. Then you go, well, what was I
 16:53:07 22 actually looking at 50 years ago for these same
 16:53:10 23 trees? Well, oak trees.

16:53:11 24 Q. (By Mr. Chachkes) I'm just talking
 16:53:13 25 about -- okay. Stick with me here. Don't talk about
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16:53:16 1 history. Don't talk about the way I'm looking at
16:53:18 2 things. Don't talk about regulations.
16:53:20 3 Just strictly objectively, what is
16:53:24 4 nonasbestiform versus asbestosiform?
16:53:27 5 MR. CIRSCH: Object to form.
16:53:28 6 Q. (By Mr. Chachkes) And if you can do that
16:53:30 7 without telling me -- without -- can you do that
16:53:33 8 without talking about the device I'm looking at it
16:53:34 9 with? Is that possible?
16:53:37 10 MR. CIRSCH: Object to form.
16:53:38 11 THE WITNESS: No --
16:53:40 12 Q. (By Mr. Chachkes) Okay. What --
16:53:43 13 A. -- because --
16:53:43 14 MR. CIRSCH: Let him answer.
16:53:43 15 THE WITNESS: What we're doing here is
16:53:44 16 we're using sophisticated devices to make the
16:53:49 17 determination if these are regulated asbestos or
16:53:50 18 not.
16:53:50 19 I understand that maybe for whatever
16:53:52 20 reason you want to just pick little pieces here
16:53:55 21 and there, but this is not what we do with this
16:53:56 22 analysis.
16:53:57 23 We're using standard peer-reviewed
16:54:02 24 published protocols for the determination of
16:54:05 25 regulated asbestos fibers and bundles.

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16:55:09 1 sorry. Strike that. Start again.

16:55:19 2 Do you agree with this statement:

16:55:21 3 Crushing of nonasbestiform amphibole can lead to

16:55:24 4 elongate fragments that conform to the definition of

16:55:27 5 a fiber?

16:55:30 6 A. **I've not seen those with these counting**

16:55:35 7 **rules. Certainly we have seen lots of these**

16:55:38 8 **fragments that are below 5-to-1 aspect ratio.**

16:55:45 9 I'm not ruling it out, but we typically

16:55:47 10 don't see that. When we did a size distribution

16:55:51 11 of --

16:55:52 12 Q. I'm not talking about what you can't

16:55:54 13 see --

16:55:55 14 MR. CIRSCH: Hold on.

16:55:56 15 THE WITNESS: Hold on, hold on.

16:55:57 16 We don't typically see that but your

16:55:59 17 hypothetical, if it does have parallel sides, if

16:56:02 18 it does meet all the definitions of the counting

16:56:04 19 rules, you can call it what you like, but it's

16:56:07 20 regulated asbestos per the standard counting

16:56:10 21 rules for every one of these TEM methods that I

16:56:13 22 have referenced in my report.

16:56:15 23 Q. (By Mr. Chachkes) I kind of lost track

16:56:17 24 there.

16:56:17 25 Do you agree with the statement: Crushing

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16:54:08 1 Q. (By Mr. Chachkes) Tremolite -- just
16:54:10 2 saying something is tremolite does not mean it's
16:54:12 3 asbestos in certain contexts; is that true?
16:54:15 4 MS. O'DELL: Object to the form.
16:54:16 5 THE WITNESS: Again, when we do these
16:54:18 6 analyses, anything that doesn't meet the
16:54:20 7 regulated asbestos counting rules we do not
16:54:23 8 count. You can call it whatever you like, but
16:54:25 9 it doesn't meet the counting rules.
16:54:27 10 Everything that we have published and
16:54:29 11 provided here is regulated asbestos fibers and
16:54:32 12 bundles.
16:54:33 13 Q. (By Mr. Chachkes) Okay. What is a
16:54:34 14 cleavage fragment?
16:54:35 15 A. **Cleavage fragment, typically for**
16:54:38 16 **tremolite, is particulates that have an aspect ratio**
16:54:41 17 **of somewhere between 1-to-1 to 1-to-2, but they will**
16:54:44 18 **have the same chemistry and the same crystalline**
19 **pattern.**

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16:56:20 1 of asbestiform amphibole can lead to elongate
16:56:23 2 fragments that conform to the definition of a fiber?
16:56:26 3 MR. CIRSCH: Object to form.
16:56:27 4 THE WITNESS: I've not seen one, so maybe
16:56:29 5 somebody else has.
16:56:30 6 Q. (By Mr. Chachkes) Okay. Do you agree
16:56:32 7 with the statement: Crushed nonasbestiform
16:56:34 8 amphiboles rarely have aspect ratios exceeding
16:56:37 9 30-to-1?
16:56:38 10 A. **I've not seen crushed -- I'm sorry, would**
16:56:42 11 **you repeat that?**
16:56:43 12 Q. Crushed nonasbestiform amphiboles rarely
16:56:46 13 have aspect ratios exceeding 30-to-1.
16:56:49 14 A. **I've rarely seen anything greater than**
16:56:53 15 **1-to-1, 2-to-1, 3-to-1.**
16:57:00 16 Q. The question is do you agree with that
16:57:02 17 statement, yes or no?
16:57:03 18 A. **That's too broad. I mean, I would say**
16:57:06 19 **crushed particles of nonregulated asbestos fibers and**
16:57:13 20 **bundles, the aspect ratio very rarely exceeds 3-to-1,**
16:57:18 21 **4-to-1.**
16:57:19 22 Q. Okay. ISO -- strike that.
16:57:24 23 What is the average width of a tremolite
16:57:28 24 fiber under the TEM?
16:57:31 25 MR. CIRSCH: Object to form.

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16:57:31 1 THE WITNESS: An individual fiber
 16:57:32 2 typically can run anywhere from about .2 to .4,
 16:57:39 3 seen some as high as .5 for an individual fiber.
 16:57:42 4 Q. (By Mr. Chachkes) Okay. Do you have a
 16:57:44 5 peer-reviewed reference to support that?
 16:57:50 6 MS. O'DELL: Your original question was
 16:57:52 7 what he had seen.
 16:57:54 8 MR. CHACHKES: Actually, no. The original
 16:57:55 9 question was what is the average width.
 16:57:56 10 THE WITNESS: I think if you look at Wylie
 16:57:58 11 and others, they say that single tremolite or
 16:58:01 12 single amphibole fibers very rarely exceed .5,
 16:58:04 13 .6. So there's a number of references out
 16:58:07 14 there. I can't remember all the citations, but
 16:58:09 15 there's a number of references on that.
 16:58:11 16 Q. (By Mr. Chachkes) The question is do you
 16:58:12 17 have a peer-reviewed reference to cite to to support
 16:58:15 18 your testimony that the average width of a tremolite
 16:58:18 19 fiber is usually between .2 and .4?
 16:58:21 20 MR. CIRSCH: Object to form.
 16:58:22 21 THE WITNESS: I've seen as high as .5.
 16:58:25 22 There's a range. And it's been published
 16:58:28 23 before, but no, I don't have the citation on me.
 16:58:30 24 Q. (By Mr. Chachkes) What's the average
 16:58:31 25 width of an anthophyllite fiber under TEM?

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16:58:37 1 MR. CIRSCH: Object to form.
 16:58:37 2 THE WITNESS: Typically in the same range
 16:58:40 3 as tremolite.
 16:58:41 4 Q. (By Mr. Chachkes) And do you have a
 16:58:44 5 citation for a peer-reviewed paper to support that?
 16:58:47 6 A. Not that I can rattle off the top of my
 16:58:51 7 head, no, sir.
 16:58:52 8 Q. What's the largest width an anthophyllite
 16:58:54 9 particle can have and still be characterized as a
 16:58:57 10 fiber under TEM?
 16:59:00 11 MR. CIRSCH: Object to form.
 16:59:01 12 MS. O'DELL: Would you repeat that,
 16:59:03 13 please?
 16:59:03 14 Q. (By Mr. Chachkes) What is the largest
 16:59:04 15 width of an anthophyllite particle -- strike that.
 16:59:08 16 What is the largest width an anthophyllite
 16:59:10 17 particle can have and still be characterized as a
 16:59:12 18 fiber under TEM?
 16:59:14 19 A. Whatever width that will exceed equal to
 16:59:22 20 5-to-1 aspect ratio. So it doesn't have a cutoff on
 16:59:26 21 the width for a single fiber. As long as it
 16:59:32 22 exceeds -- greater than or equal to 5 -- aspect ratio
 16:59:35 23 of 5.
 16:59:36 24 Q. So the width doesn't matter; it's the
 16:59:38 25 aspect ratio that matters?

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16:59:40 1 A. Correct.
 16:59:40 2 Q. Okay. Do you have a reference,
 16:59:43 3 peer-reviewed reference, to cite for that?
 16:59:45 4 A. Every one of the counting protocols do not
 16:59:48 5 have a maximum on the width. They all have the same
 16:59:52 6 counting protocol for the aspect ratios for the
 16:59:56 7 length, for greater than .5 micrometers. So they're
 17:00:00 8 all the same.
 17:00:01 9 I'm not aware of any of these
 17:00:02 10 peer-reviewed publications, protocols, stating that
 17:00:08 11 there is a maximum width.
 17:00:11 12 MR. CIRSCH: We've been going about an
 17:00:12 13 hour, so when you get to the next spot, can we
 17:00:15 14 take a break?
 17:00:16 15 MR. CHACHKES: Sure. Give me maybe like 5
 17:00:17 16 more minutes; is that okay?
 17:00:18 17 MR. CIRSCH: It's up to the doctor.
 17:00:18 18 THE WITNESS: I would like to take a break
 17:00:20 19 now.
 17:00:20 20 Q. (By Mr. Chachkes) Okay. Can I just
 17:00:22 21 ask -- let me ask one more --
 22 A. Okay.
 17:00:24 23 Q. -- because it's just basically the same
 17:00:25 24 one, tremolite.
 17:00:26 25 What is the largest width a tremolite

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17:00:28 1 particle can have and still be characterized as a
 17:00:30 2 fiber under TEM? Is it same answer?
 17:00:32 3 A. It's the same answer. Now, we don't see
 17:00:34 4 any single fibers with widths that exceed or that are
 17:00:39 5 any width. I mean, it's in that range that I've
 17:00:42 6 talked about.
 17:00:43 7 Typically, when it gets larger, it is a
 17:00:45 8 bundle, and you can have -- we've had bundles as wide
 17:00:49 9 as 1 to 2 micrometers in diameter, but that's made up
 17:00:53 10 of -- something that big is made up tens to hundreds
 17:00:57 11 of individual fibers.
 17:00:57 12 Q. But hypothetically, you see a tremolite
 17:00:58 13 particle with a width of 1, you would still
 17:01:01 14 characterize that as a fiber if the aspect ratio was
 17:01:06 15 in the right range?
 17:01:08 16 MR. CIRSCH: Object to form.
 17:01:09 17 THE WITNESS: Hypothetically, because I
 17:01:11 18 don't believe we've ever seen one in any of
 17:01:13 19 these protocol -- any of these analyses. But if
 17:01:14 20 it has -- if it meets the peer-reviewed counting
 17:01:18 21 rules for regulated asbestos, yes, it would be
 17:01:21 22 counted, hypothetically.
 17:01:23 23 MR. CHACHKES: Okay. Let's take a break.
 17:01:25 24 (Recess from 5:01 p.m. to 5:20 p.m.)
 17:21:00 25 Q. (By Mr. Chachkes) Going back to

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17:21:07 1 Exhibit 21, which is ISO 13794, now, 2.7, that's a
17:21:16 2 definition of asbestos; correct?
17:21:20 3 A. **2.7?**
17:21:21 4 Q. Yes. On page 2.
17:21:23 5 A. **Oh.**
17:21:42 6 Q. Is that a definition of asbestos?
17:21:45 7 A. **That's their definition, yes, sir.**
17:21:47 8 Q. Okay. Now, I've heard you use the phrase,
17:21:50 9 the distinction, geological and regulatory
17:21:54 10 definitions as if they were different. Which one is
17:21:57 11 this?
17:21:58 12 A. **It's just a general definition.**
17:22:04 13 Q. Okay. It's not a geological definition,
17:22:07 14 it's not a regulatory definition, it's just a
17:22:09 15 definition?
17:22:10 16 A. **Let's see. Crystallized in asbestosiform
habit. That's for both. Long, thin, flexible,
strong fibers when crushed or processed. They don't
define what strong is, but that's just a general
definition.**
17:22:23 21 Q. Okay. Is it your opinion that there's no
17:22:28 22 such thing as a cleavage fragment for something that
17:22:31 23 has a greater than 5-to-1 aspect ratio?
17:22:33 24 A. **I never said that.**
17:22:34 25 Q. Okay. Is there such a thing as a cleavage

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17:23:48 1 Q. Is it written down?
17:23:51 2 A. **Yes.**
17:23:51 3 Q. Have you produced it?
17:23:53 4 A. **No.**
17:23:54 5 MR. CHACHKES: Okay. We'd like that
17:23:56 6 produced.
17:23:56 7 MS. O'DELL: We'll consider it.
17:23:57 8 Q. (By Mr. Chachkes) Okay. Does MAS have a
17:23:58 9 protocol in place for describing the dimensions of
17:24:01 10 fibers -- sorry.
17:24:10 11 What do you call that protocol? Is there
17:24:12 12 a name for it?
17:24:13 13 A. **Well, the protocol is the method we have
here. It tells you how to make those measurements.
It has -- the microscopes have calibrated concentric
circles that allow you to make the measurements for
greater than .5 micrometers. It is -- parallel sides
is a visual determination.**
17:24:37 19 MR. CHACHKES: Let's look at that. Let's
17:24:39 20 look at some TEM photomicrographs. Can we mark
17:24:43 21 this Exhibit 22? Can we just put the sticker
17:24:52 22 here so it doesn't obstruct anything?
17:24:54 23 (Defendants' Exhibit 22 was marked for
17:25:15 24 identification.)
17:25:15 25 Q. (By Mr. Chachkes) All right. Look at

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17:22:40 1 fragment for something that has a greater than 5-to-1
17:22:41 2 aspect ratio?
17:22:41 3 A. **With parallel sides we've not seen one,
but I guess hypothetically it's possible.**
17:22:46 5 Q. Okay. Is there anything in the published
17:22:55 6 literature that you've seen that suggests that there
17:22:58 7 are cleavage fragments with a greater than 5-to-1
17:23:02 8 aspect ratio?
17:23:02 9 A. **There's been a number of published
articles that state things like that, yes.**
17:23:08 11 Q. Are there any published articles that
17:23:11 12 state that there are cleavage fragments that have
17:23:13 13 greater than 3-to-1 aspect ratio?
17:23:15 14 A. **Yes, there is publications that state
that.**
17:23:19 16 Q. Okay. If I pulled a hand-sized amphibole
17:23:27 17 rock out that had a greater than 5-to-1 aspect ratio,
17:23:32 18 would you call that a fiber?
17:23:34 19 MR. CIRSCH: Object to form.
17:23:34 20 THE WITNESS: If it is a rock and doesn't
17:23:36 21 have any parallel sides that define a fiber, no.
17:23:40 22 Q. (By Mr. Chachkes) Does MAS have a
17:23:42 23 protocol in place for describing the dimensions of
17:23:44 24 fibers under the visual inspection under TEM?
17:23:47 25 A. **Yes.**

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17:25:16 1 Exhibit 22. Can you tell me what -- that very top
17:25:22 2 row of three, is that asbestosiform fibers, if you knew
17:25:28 3 you were looking at an amphibole?
17:25:30 4 A. **Top row, this one?**
17:25:32 5 Q. Yeah.
17:25:34 6 A. **Just looking at the photograph, I would
state that that is a regulated asbestos size --
asbestosiform or not for these different photographs.**
17:25:41 9 Q. All right.
17:25:48 10 A. **Certainly one, I would say two. I'd have
to be looking at that under a TEM to make that
determination if it's asbestosiform or not. It
certainly has the aspect ratio; it has parallel
sides. That would be a regulated asbestos, at least
in TEM. It's unclear. This may be -- this may be
optical microscopy.**
17:26:13 17 Q. That third one on the very top row, what
17:26:17 18 could you see under TEM or do under TEM that would
17:26:20 19 make you say, oh, that's not regulated asbestos,
17:26:25 20 assuming it's an amphibole?
17:26:26 21 A. **Well I would have to be looking at it
under the TEM so -- you're looking at an optical
microscopy picture.**
17:26:33 24 Q. But what is it you would be -- what is it
17:26:36 25 that you could see under a TEM that would make you

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17:26:38 1 think that's not -- because the aspect ratio
 17:26:40 2 obviously is greater than 5-to-1; right?
 17:26:41 3 **A. Well, I would take a look at it and see**
 17:26:43 4 **parallel sides, is that multiple fibers. I don't**
 17:26:48 5 **know what magnification this is at.**
 17:26:50 6 **So again, I would prefer to be looking at**
 17:26:51 7 **something under a TEM than just play**
 17:26:54 8 **guess-what-this-is.**
 17:26:54 9 Q. Okay. So it's possible what you're
 17:26:56 10 looking at there which has an aspect ratio of -- it's
 17:27:00 11 greater than 5-to-1; right?
 17:27:01 12 A. **That's correct.**
 17:27:02 13 Q. Okay. It's possible that that's not --
 17:27:04 14 that's nonasbestiform if it doesn't have parallel
 17:27:08 15 sides; is that true?
 17:27:09 16 A. **Again, this is an optical microscopy**
 17:27:11 17 **picture. So unless I was looking at this under the**
 17:27:14 18 **TEM, but certainly has parallel sides. I don't know**
 17:27:17 19 **the width. I can't really make out the micron bar, I**
 17:27:21 20 **don't know the magnification.**
 17:27:22 21 **So you'll have to get some other expert to**
 17:27:25 22 **take a look at it, if he's willing to opine what that**
 17:27:29 23 **is versus the counting rules in the TEM.**
 17:27:32 24 Q. In the second row, assuming that
 17:27:36 25 everything in the second row is amphibole, would you

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17:28:56 1 Q. Well, let's not get ahead of ourselves.
 17:29:00 2 Now, in the third row, do you have enough
 17:29:04 3 information from these pictures to see whether
 17:29:07 4 they're bundles or fibers?
 17:29:09 5 A. **No. It's too out of focus.**
 17:29:12 6 Q. Okay.
 17:29:15 7 A. **I would -- looks like you have dark field**
 17:29:18 8 **here. I would have to see this in the TEM.**
 17:29:17 9 Q. Okay. In the second row, far left, do you
 17:29:21 10 have enough -- does it appear to you whether there
 17:29:24 11 are bundles or fibers?
 17:29:25 12 A. **No, you can't make out. Most of these are**
 17:29:27 13 **just particles. And I would have to be looking at**
 17:29:31 14 **this one that has parallel sides. But I would have**
 17:29:36 15 **to be determining if I could see individual fibers in**
 17:29:38 16 **it or not.**
 17:29:39 17 Q. In the fourth row, second from the bottom,
 17:29:46 18 are these asbestiform?
 17:29:48 19 A. **Maybe.**
 17:29:50 20 Q. What additional information would you need
 17:29:53 21 to determine that?
 17:29:53 22 A. **I need to be looking at it in the TEM**
 17:29:58 23 **or -- so that I can make a determination. The size,**
 17:30:02 24 **the magnification.**
 17:30:08 25 Q. Do you have enough information in the

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17:27:40 1 call those asbestiform or not?
 17:27:44 2 A. **Again, I'm looking at an optical**
 17:27:51 3 **microscopy picture. We've got a bundle that -- I**
 17:27:58 4 **mean, I can't look at the micron bar. Possibly just**
 17:28:01 5 **the one in the middle because you can see individual**
 17:28:03 6 **fibrils.**
 17:28:04 7 Q. Okay. If you saw that under your TEM,
 17:28:07 8 would you label that as asbestos?
 17:28:08 9 A. **Well, I'm not looking at it under TEM. So**
 17:28:13 10 **if it's under an optical microscopy method and it**
 17:28:16 11 **meets the definition, it's got parallel sides, it**
 17:28:20 12 **looks like it has multiple fibers in the bundle, that**
 17:28:23 13 **by definition is asbestiform.**
 17:28:25 14 Q. And why do you say it looks like it has
 17:28:28 15 multiple fibers in the bundle?
 17:28:29 16 A. **Because I can see them.**
 17:28:30 17 Q. Okay. You're referring to the lines that
 17:28:34 18 go from the northwest towards the southeast starting
 17:28:36 19 in the top?
 17:28:37 20 A. **Yes, sir.**
 17:28:37 21 Q. Okay. In the third row, assuming those
 17:28:40 22 are amphiboles, do you have enough information to
 17:28:44 23 determine whether they're asbestiform?
 17:28:46 24 A. **I can't really see what we have here under**
 17:28:50 25 **these. And I'm assuming the fourth and five row --**

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17:30:10 1 second -- in that second-to-last row, those three
 17:30:13 2 pictures, to determine whether that's asbestiform?
 17:30:15 3 A. **I wouldn't make that call either way**
 17:30:19 4 **unless I could be looking at it under the TEM. It**
 17:30:22 5 **looks like very little magnification. And I**
 17:30:25 6 **apologize, but they're fairly poor photographs.**
 17:30:28 7 Q. Okay. In the last row, same question. In
 17:30:31 8 those three pictures at the very bottom of
 17:30:34 9 Exhibit 22, are those -- see the single fibers -- the
 17:30:37 10 single item in the middle, would you call that
 17:30:40 11 asbestiform?
 17:30:41 12 A. **It has parallel sides. I can't see**
 17:30:48 13 **individual fibers. But I would call that a regulated**
 17:30:52 14 **asbestos fiber or bundle, maybe.**
 17:30:55 15 **Again, I would need to be looking at the**
 17:30:57 16 **TEM analysis of these or at least better photographs.**
 17:31:01 17 Q. Okay. So the bottom six are all TEM
 17:31:08 18 photomicrographs from you? You realize that; right?
 17:31:12 19 MR. CIRSCH: Object to form.
 17:31:13 20 THE WITNESS: And that's fine. If you
 17:31:14 21 tell me which ones they are, at least I can get
 17:31:17 22 better images.
 17:31:17 23 Q. (By Mr. Chachkes) These are the images
 17:31:20 24 you provided to us; right?
 17:31:22 25 A. **Well, when we provide the book, we provide**

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17:31:25 1 **a large photograph that has better resolution,**
 17:31:30 2 **et cetera.**

17:31:33 3 Q. Okay. Yeah, let's go look at -- let's
 17:31:35 4 look in the book, the upper left. So from the
 17:31:38 5 bottom -- what?

17:31:44 6 MS. TROVATO: I'll let you know which one
 17:31:45 7 I have marked.

17:31:47 8 MR. CHACHKES: Okay. I'm going to grab
 17:31:48 9 one for you from the book. Just tear it out.

17:31:54 10 Okay. Let's mark it as Exhibit 23.

17:31:59 11 (Defendants' Exhibit 23 was marked for
 12 identification.)

17:32:21 13 (Off the record.)

17:32:21 14 Q. (By Mr. Chachkes) Okay. So around
 17:32:23 15 page 985. Okay. So this one corresponds to second-
 17:32:28 16 to-the-last row, far right; correct?

17:32:34 17 A. Yes.

17:32:34 18 Q. Okay. Are you looking at something that's
 17:32:36 19 asbestosiform there?

17:32:37 20 A. I'm looking at a regulated asbestos
 17:32:43 21 structure. We have talc underneath it. But I would
 17:32:46 22 see individual fibers -- you know, I'm not on the
 17:32:51 23 TEM. This is only 1/2 micrometer in width, but it
 17:32:54 24 looks like we have individual fibers in here. So
 17:32:56 25 yes.

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17:32:56 1 Q. Okay. Is this -- so for those of us who
 17:33:03 2 are trying to determine whether you made the right
 17:33:05 3 call, is this photomicrograph enough to determine the
 17:33:08 4 morphology of what we're looking at?

17:33:13 5 A. Yes.

17:33:14 6 Q. Okay. In your old reports, the reports
 17:33:33 7 that were the non-MDL samples, would you agree that
 17:33:36 8 you characterized the majority of the particles
 17:33:38 9 identified as fibrous, not bundles?

17:33:41 10 MR. CIRSCH: Object to form.

17:33:42 11 THE WITNESS: I don't think I ever counted
 17:33:45 12 them up.

17:33:45 13 Q. (By Mr. Chachkes) Okay. In your MDL --
 17:33:50 14 but the majority, the large majority is fiber, not
 17:33:53 15 bundles in the old MDL reports?

17:33:56 16 MS. O'DELL: Object to form.

17:33:58 17 THE WITNESS: I'm not sure I agree with
 17:33:58 18 that.

17:33:58 19 Q. (By Mr. Chachkes) I'm sorry, the old
 17:33:59 20 non-MDL reports.

17:34:00 21 A. I'd have to look at them to see if I agree
 17:34:03 22 with that or not.

17:34:03 23 Q. Okay. In your new -- the MDL reports,
 17:34:07 24 about 96 percent of the particles your analysts
 17:34:11 25 identify are bundles; correct?

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17:34:12 1 A. Correct.

17:34:12 2 Q. If there's a stark difference between the
 17:34:18 3 ratio of fibers to bundle found as compared between
 17:34:21 4 the MDL sample analysis and the non-MDL sample
 17:34:25 5 analysis, what would explain that?

17:34:26 6 MR. CIRSCH: Object to form.

17:34:27 7 THE WITNESS: That there was more bundles
 17:34:29 8 than fibers.

17:34:30 9 Q. (By Mr. Chachkes) Aren't they supposed to
 17:34:31 10 be the same thing, representative sample of J&J talc?

17:34:35 11 MR. CIRSCH: Object to form.

17:34:35 12 THE WITNESS: Not necessarily.

17:34:36 13 Q. (By Mr. Chachkes) Why not?

17:34:37 14 A. It's just a matter of where -- the area in
 17:34:40 15 the mine and what was dug out, if that was correct,
 17:34:42 16 then we should say that all J&J talc has these
 17:34:46 17 concentrations of asbestos. So that doesn't bother
 17:34:50 18 me.

17:34:50 19 Q. You think it might be random chance that
 17:34:55 20 the same mine samples in your old reports you report
 17:35:00 21 majority of fibers, and in your new reports you
 17:35:04 22 report as almost exclusively bundles?

17:35:06 23 MR. CIRSCH: Object to form.

17:35:08 24 THE WITNESS: We just call them as we see
 17:35:09 25 them.

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17:35:10 1 Q. (By Mr. Chachkes) But is it random
 17:35:11 2 chance? That's what I'm asking.

17:35:12 3 A. I don't know if it's random chance or not.

17:35:16 4 These are what we distinguish as fibers and bundles.

17:35:20 5 Q. Okay. One would expect a random sample of
 17:35:23 6 bottles from a Vermont mine over time to have the
 17:35:27 7 same ratio whether you are looking last year or this
 17:35:30 8 year; right?

17:35:31 9 MR. CIRSCH: Object to form.

17:35:32 10 THE WITNESS: I'm only aware of in the old
 17:35:36 11 samples that there was two that could be said
 17:35:39 12 came from Vermont. So we're looking at a much
 17:35:42 13 bigger population of Vermont samples than we
 17:35:45 14 were of the originals. And one of those was a
 17:35:50 15 MDL sample. So you're comparing apples and
 17:35:54 16 oranges.

17:35:55 17 Q. (By Mr. Chachkes) What about the Italian?

17:35:56 18 A. The Italian, I'd have to look at it and
 17:36:01 19 count them up because there wasn't that many fibers
 17:36:04 20 as compared to the others, so we have a bigger pool
 17:36:06 21 of fibers and bundles.

17:36:07 22 Q. If you did the entire set of MDL samples
 17:36:10 23 over again, would you expect to find the same ratio
 17:36:13 24 of bundles to fibers?

17:36:17 25 MR. CIRSCH: Object to form.

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17:36:17 1 THE WITNESS: I don't have any expectation
 17:36:19 2 of what we're going to find or what we expect.
 17:36:21 3 We just count using the protocols and make the
 17:36:25 4 decision on what morphology it is.
 17:36:27 5 Q. (By Mr. Chachkes) Okay. Have you
 17:36:28 6 testified that the modified Blount TEM method you
 17:36:31 7 employed in your March 2018 report is materially
 17:36:35 8 identical to the ISO 22262?
 17:36:37 9 A. I don't think I -- it's not identical.
 17:36:43 10 **The old Blount report uses a different heavy density**
 17:36:47 11 **liquid separation. But the ISO, we can use the same**
 17:36:52 12 **spin rate, same time for rpm and spin rate.**
 17:36:59 13 **But the difference is the -- even the old**
 17:37:03 14 **Blount is the same. And that's -- what's interesting**
 17:37:06 15 **about the ISO 22262-2, it gives you the leeway to use**
 17:37:11 16 **whatever you need to use. And the only thing it**
 17:37:16 17 **really specifies is the density of the heavy liquid.**
 17:37:21 18 Q. You used the Blount TEM method in your
 17:37:23 19 March 2018 report; correct?
 17:37:24 20 A. Correct.
 17:37:24 21 Q. Was it materially identical to what's
 17:37:28 22 mandated in ISO 22262?
 17:37:32 23 A. ISO 22262 doesn't mandate any particular
 17:37:35 24 conditions. So you can use whatever procedures you
 17:37:41 25 feel work the best. And that's because the spin

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17:38:49 1 THE WITNESS: I'd have to look and see who
 17:38:50 2 the four people are because there are some folks
 17:38:53 3 who started doing, you know, analysis now may
 17:38:57 4 not have been doing analysis then, and there's
 17:38:59 5 some folks doing analysis then that are not
 17:39:02 6 doing analysis now. It's just easy to look in
 17:39:05 7 the count sheets and see if they're the same or
 17:39:08 8 not.
 17:39:08 9 Q. (By Mr. Chachkes) Is there additional
 17:39:12 10 data concerning the samples upon which you reported
 17:39:15 11 for TEM that is in a file somewhere in your
 17:39:20 12 laboratory but not printed out and not produced?
 17:39:22 13 A. All the data for these particular samples
 17:39:25 14 are here.
 17:39:25 15 Q. Okay. Was there any data generated in
 17:39:28 16 connection with the TEM analysis in this case that
 17:39:30 17 was thrown away or deleted?
 17:39:32 18 A. No, not that I'm aware of.
 17:39:34 19 Q. You personally have not conducted any of
 17:39:37 20 the PLM testing included in your MDL report; correct?
 17:39:40 21 A. That is correct.
 17:39:40 22 Q. Did you sit with your analysts as they did
 17:39:42 23 the PLM testing?
 17:39:45 24 A. I have probably looked in that optical
 17:39:47 25 microscope 50 times in the last two months.

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17:37:45 1 **rates and rpm does not really affect the overall**
 17:37:48 2 **concentrations, and it happened to be the same**
 17:37:51 3 **density, liquid density.**
 17:37:53 4 Q. You've testified that the same four
 17:37:56 5 associates at MAS have conducted all of MAS's
 17:37:58 6 analysis of Johnson's Baby Powder in your reports
 17:38:01 7 going all the way back to 2017; is that correct?
 17:38:03 8 MR. CIRSCH: Object to form.
 17:38:04 9 THE WITNESS: We have some of the same
 17:38:08 10 people, yes.
 17:38:09 11 Q. (By Mr. Chachkes) Okay. What about are
 17:38:11 12 they the same? Is it the same people who were
 17:38:13 13 doing -- analyzing Johnson Baby Powder in early 2017
 17:38:19 14 as are doing it now?
 17:38:22 15 A. You'll have to clarify that question.
 17:38:25 16 Q. Well, there were four people doing
 17:38:28 17 analysis in the MDL report; right?
 17:38:30 18 A. Correct.
 17:38:30 19 Q. There are four people doing analysis in
 17:38:33 20 the reports that rely on research all the way back
 17:38:39 21 to -- analysis all the way back to 2017; correct?
 17:38:42 22 A. I'd have to look at that.
 17:38:43 23 Q. Okay. I'm asking is it the same four
 17:38:46 24 people? You don't know?
 17:38:48 25 MR. CIRSCH: Object to the form.

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17:39:50 1 Q. So when you say you've looked in it,
 17:39:52 2 you've looked in it while your analysts were testing
 17:39:58 3 MDL samples for the purposes of your current report?
 17:40:00 4 A. Well, you can't -- both of you can't look
 17:40:02 5 in the microscope at the same time. A lot of times
 17:40:05 6 it's on the monitor that we use so that we can
 17:40:09 7 increase the sensitivity. But, no, I don't
 17:40:12 8 personally do the PLM analysis.
 17:40:14 9 Q. Yeah, but I'm trying to get the sense of
 17:40:16 10 were you actively involved looking through the
 17:40:20 11 microscope or looking along with the other person
 17:40:23 12 into the microscope for the PLM that's reported on in
 17:40:25 13 the MDL?
 17:40:27 14 A. I have been active with the PLM
 17:40:29 15 microscopists looking at structures, looking at
 17:40:34 16 different aspects of it, but ultimately he makes the
 17:40:38 17 decision.
 17:40:38 18 Q. Okay. So the decisions -- the opinions in
 17:40:43 19 your report about whether the PLM was a positive for
 17:40:46 20 asbestos, those are the opinions of your analysts?
 17:40:50 21 A. It's not an opinion.
 17:40:51 22 MS. O'DELL: Form.
 17:40:52 23 THE WITNESS: It meets the definition. It
 17:40:54 24 has the right crystalline information. It meets
 17:40:58 25 all the different definitions. To me, that is

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17:41:00	1	not an opinion.	17:42:56	1	correct?
17:41:01	2	Q. (By Mr. Chachkes) Okay. Those are the conclusions of your analysts?	17:42:56	2	A. Individual fibers, unless they have a number of fibers in a bundle. But we don't see individual fibers. In fact, we haven't seen any individual fiber in any of these analyses that we've done. They've all been very large bundles.
17:41:03	3		17:43:00	4	
17:41:05	4	A. Yes.	17:43:04	5	
17:41:06	5	Q. Okay. You have personally never tested a talc sample for asbestos from start to finish	17:43:07	6	
17:41:08	6		17:43:09	7	
17:41:10	7	yourself?	17:43:13	8	Q. Is it unambiguously true that asbestos particles must be at least 1/2 micrometer in the smallest dimension to be visible under PLM?
17:41:11	8	A. That is correct.	17:43:19	9	
17:41:11	9	Q. You're not trained in using PLM for the purposes of testing talc for asbestos?	17:43:23	10	A. That's what's stated. We never see individual fibers of any size. Everything that we have run across is these very large bundles that have multiple fibers in them.
17:41:14	10	MR. CIRSCH: Object to form.	17:43:35	11	
17:41:17	11	THE WITNESS: I have not taken a PLM course for asbestos.	17:43:38	12	
17:41:18	12		17:43:42	13	
17:41:20	13	Q. (By Mr. Chachkes) You've not published any PLM methodologies?	17:43:46	14	Q. But I'm talking about not what you're actually seeing, but this is a matter of the resolution.
17:41:20	14		17:43:50	15	
17:41:25	15	A. No, sir. We're not using our methodologies. We're using the standard protocol methodologies. So if we were to publish -- when we publish this, we would be publishing that this is the method we used. That's like everybody else.	17:43:54	16	
17:41:27	16		17:43:58	17	Must asbestos particles be at least 1/2 micrometer in the smallest dimension to be visible under PLM?
17:41:29	17		17:43:59	18	
17:41:33	18		17:43:59	19	
17:41:36	19		17:44:03	20	A. It may be visible, but it's hard to go through the dispersion staining and everything associated to make a positive identification.
17:41:39	20		17:44:07	21	
17:41:42	21	Q. Have you published any PLM work testing for asbestos in any context?	17:44:07	22	
17:41:44	22		17:44:07	23	So maybe theoretically that's possible, but it's not something that's routinely seen, that I know of.
17:41:47	23	A. Yes.	17:44:07	24	
17:41:51	24	Q. What is it?	17:44:07	25	
17:41:52	25	A. Our gasket study, our vermiculite studies,	17:44:07		

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17:41:59	1	our -- that have been published. A number of papers are published where it's going to be a study on exposure. You usually have to determine what the concentration of asbestos is in the materials before you publish that.	17:44:04	1	Q. Do you have the ability to detect asbestos fibers with a width of approximately .3 micrometers by PLM?
17:42:03	2		17:44:08	2	
17:42:05	3		17:44:13	3	
17:42:08	4		17:44:15	4	A. Again, it may be theoretically possible, but I'm not aware that it's routinely done. We've never seen any in the cosmetic talc.
17:42:11	5		17:44:19	5	
17:42:12	6	Q. Those are published in peer-reviewed literature?	17:44:23	6	
17:42:14	7		17:44:25	7	Q. Shouldn't the particle distribution be on a bell curve so that you would expect that some exist?
17:42:14	8	A. Yes, sir.	17:44:33	8	
17:42:15	9	Q. Okay. But those are not finding asbestos in talc; right?	17:44:37	9	
17:42:17	10		17:44:37	10	MR. CIRSCH: Object to form.
17:42:21	11	A. No, sir. These are all construction products.	17:44:38	11	THE WITNESS: I'm sure there is -- it is in there because a lot of these we have positive
17:42:25	12		17:44:41	12	
17:42:26	13	Q. Are you an expert in PLM?	17:44:43	13	
17:42:30	14	A. I think I know more than the average layperson.	17:44:47	14	
17:42:32	15		17:44:49	15	
17:42:32	16	Q. Are you an expert in PLM?	17:44:52	16	
17:42:36	17	MR. CIRSCH: Object to form.	17:44:56	17	
17:42:37	18	THE WITNESS: Again, that's up to a judge to be an expert.	17:45:01	18	
17:42:38	19		17:45:04	19	
17:42:39	20	I know how the analysis is done, I could do an analysis if I -- it would take me a lot longer than what people typically do.	17:45:08	20	
17:42:42	21		17:45:09	21	
17:42:46	22		17:45:12	22	
17:42:47	23	Q. (By Mr. Chachkes) One of the disadvantages of PLM that you cite is that it cannot resolve particles less than 1/2 micrometer; is that	17:45:15	23	A. It's my position that these are fibers, and single fibers are not being resolved in this matrix or seen by the PLM.
17:42:48	24		17:45:20	24	
17:42:51	25	Atlanta Reporters, Inc. 866-344-0459 www.atlanta-reporters.com	17:45:22	25	Q. Is that because your analysts haven't observed it, or is it just because of the nature of

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17:45:24 1 the devices? Do you have some higher level
 17:45:27 2 understanding of the nature of the devices?
 17:45:29 3 MR. CIRSCH: Object to form.
 17:45:30 4 Q. (By Mr. Chachkes) It is empirical or is
 17:45:32 5 it something different?
 17:45:32 6 MR. CIRSCH: Object to form.
 17:45:33 7 THE WITNESS: I don't know if it's
 17:45:36 8 empirical or not.
 17:45:37 9 I mean, we haven't answered all the
 17:45:40 10 questions about the PLM analysis of cosmetic
 17:45:43 11 talc. But we do know that to do a PLM analysis
 17:45:48 12 properly, you have to spend the time necessary.
 17:45:51 13 You have to look at the sample in dispersion
 17:45:56 14 staining. You need a high definition camera as
 17:45:58 15 well as a monitor so that you can resolve and
 17:46:02 16 get the focal plane necessary to see individual
 17:46:04 17 fibers.
 17:46:06 18 But we haven't run across individual
 17:46:08 19 fibers. I know every protocol says, well, you
 17:46:10 20 can see down to .5, you can see down to .3.
 17:46:14 21 There's one thing about seeing them. There's
 17:46:16 22 another thing going through the process of being
 17:46:18 23 able to see the colors in the dispersion
 17:46:21 24 staining, the extinction angle.
 17:46:24 25 I just don't know if that's really

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17:46:26 1 possible because this type of matrix that we're
 17:46:30 2 looking at is so different than what PLM
 17:46:32 3 analysts are typically dealing with.
 17:46:35 4 Q. (By Mr. Chachkes) Did MAS test any talcum
 17:46:41 5 powder samples with the ISO 22262 method prior to the
 17:46:44 6 analysis included in your reports in this case?
 17:46:47 7 MR. CIRSCH: Object to form.
 17:46:48 8 THE WITNESS: No. I mean, we may have --
 17:46:51 9 you know, we're slowly trying to work through
 17:46:54 10 the old non-MDLs so that we can compare apples
 17:46:58 11 to oranges. But when we get done with that,
 17:47:03 12 we'll issue another report.
 17:47:03 13 Q. (By Mr. Chachkes) Have you analyzed the
 17:47:05 14 old talcum powder samples under ISO 22262 recently?
 17:47:12 15 A. I don't know. I haven't been focused in
 17:47:15 16 on that. There may be some done.
 17:47:17 17 Q. Is it possible -- strike that.
 17:47:22 18 ISO 22262 method is promulgated by the
 17:47:28 19 International Organization for Standardization; is
 17:47:28 20 that correct?
 17:47:29 21 A. Yes, sir.
 17:47:29 22 Q. Are you currently a member of any of the
 17:47:32 23 ISO national standards bodies?
 17:47:33 24 A. I am not.
 17:47:34 25 Q. Did you vote on any of the ISO standards?

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17:47:37 1 A. I did not.
 17:47:39 2 Q. Did you participate in the drafting of any
 17:47:42 3 ISO standards?
 17:47:43 4 A. I did not.
 17:47:44 5 Q. Have you spoken with any of the authors of
 17:47:46 6 any of the ISO standards that we talked about today?
 17:47:50 7 A. Not in some time, but not specifically
 17:47:53 8 about the 22262-1 and 2.
 17:47:55 9 Q. What about 3?
 17:47:57 10 A. No, sir, I haven't spoken to anybody about
 17:48:00 11 3 -- any of the authors of 3.
 17:48:01 12 Q. Which of the three parts of the ISO 22262
 17:48:06 13 did your analysts employ in the analysis of the ISO
 17:48:11 14 PLM portion of your report?
 17:48:15 15 MR. CIRSCH: Object to form.
 17:48:16 16 THE WITNESS: All the counting rules, all
 17:48:18 17 the -- what's defined as asbestosiform, what's the
 17:48:22 18 20-to-1. Everything that's used in there.
 17:48:26 19 Q. (By Mr. Chachkes) So you're saying it
 17:48:28 20 didn't matter, it's the same in all of 1 -- part 1,
 17:48:31 21 part 2, and part 3?
 17:48:32 22 A. Well, I misunderstood the question.
 17:48:34 23 Q. Yeah, let me ask it again a little better.
 17:48:36 24 Which of part 1, part 2, or part 3 did
 17:48:41 25 your analysts use when they analyzed the MDL samples
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17:48:48 1 under PLM?
 17:48:49 2 A. Part 1.
 17:48:49 3 Q. Do you know when those methods in part 1
 17:48:53 4 were promulgated?
 17:48:55 5 A. Looks like 2012/07/01.
 17:49:06 6 Q. What do you mean by 2012/07/01?
 17:49:12 7 A. I'm just looking at when it says it was
 17:49:14 8 issued. ISO -- so it has 2012, first edition, and I
 17:49:22 9 don't know if they're using 07 as the day and 01 as
 17:49:26 10 the month or the other way around.
 17:49:27 11 Q. So part 1 was promulgated in 2012?
 17:49:31 12 A. Yes, sir.
 17:49:31 13 Q. Okay. Are you aware of any other talc
 17:49:34 14 testing methods published in the scientific
 17:49:36 15 literature from 1991 to 2014 that include a
 17:49:41 16 concentration method?
 17:49:43 17 A. Let's see. When was --
 17:49:46 18 Q. You should use yours.
 17:49:49 19 A. I'm just looking at the date.
 17:49:51 20 This one was 2014.
 17:49:53 21 Q. You say this one's part 2; correct?
 17:49:55 22 A. Part 2.
 17:49:55 23 Q. Yeah. So I'm saying between 1991 and
 17:49:58 24 2014, are you aware of any testing -- talc testing
 17:50:01 25 methods in the published scientific literature that
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17:50:03	1	include a concentration method?	17:52:41	1	looking at the area that is covered by the asbestos
17:50:16	2	A. The 1989 and 1990 papers published by	17:52:45	2	versus the area that you're looking at. So there's
17:50:19	3	Blount. She's analyzing talc. She's using the	17:52:48	3	calibrated petrographic materials to help optical
17:50:23	4	concentration method.	17:52:54	4	microscopists to make these qualitative estimates.
17:50:25	5	Q. Are you aware of any other?	17:52:58	5	Q. How often do you update your lab's weight
17:50:27	6	A. That specifically say talc, no.	17:53:02	6	percentage standards?
17:50:30	7	Q. Are you aware of any other talc testing	17:53:03	7	A. I think we updated them the last time we
17:50:33	8	methods published in the scientific literature prior	17:53:08	8	sent stuff to Lee Poye.
17:50:36	9	to 1991 that include a concentration method?	17:53:10	9	Q. And what regularity -- with what
17:50:39	10	A. Not in the published literature, no.	17:53:14	10	regularity do you update those?
17:50:44	11	Q. One strength of PLM is that it can provide	17:53:17	11	A. We don't have a regulatory. We make new
17:50:48	12	a qualitative estimate of the weight percentage of	17:53:19	12	standards and send them off; and if we need
17:50:52	13	asbestos; true?	17:53:22	13	additional standards, we make them again.
17:50:53	14	A. That is a strength, yes.	17:53:24	14	Q. Who generated those standards?
17:50:55	15	Q. What does the word qualitative mean in	17:53:25	15	A. Victoria Panariello.
17:50:58	16	that answer?	17:53:28	16	Q. Okay. Did you monitor her when she did
17:50:59	17	A. That it's an estimate based on	17:53:31	17	that?
17:51:01	18	petrographic standards for how much material is --	17:53:32	18	A. Did I sit here and -- stand there and
17:51:09	19	that you're estimating on.	17:53:34	19	watch her? No.
17:51:11	20	Q. Your analysts conducted a visual	17:53:35	20	Q. Did you monitor her in any other way?
17:51:14	21	estimation of the concentration of asbestos fibers in	17:53:37	21	A. No.
17:51:16	22	the talc samples?	17:53:37	22	Q. Are you aware your method includes a
17:51:17	23	A. Asbestos bundles, yes, sir.	17:53:41	23	qualification that visual estimations of asbestos
17:51:19	24	Q. Okay. Your report also references	17:53:43	24	concentrations pursuant to this method have been
17:51:25	25	generated weight percentage standards; correct?	17:53:46	25	demonstrated to consistently yield an overestimate of
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17:51:29	1	A. Yes.	17:53:49	1	the proportion of asbestos?
17:51:29	2	Q. How were your lab's weight percentage	17:53:53	2	MS. O'DELL: Object to the form.
17:51:33	3	standards generated?	17:53:54	3	THE WITNESS: I'm sorry, where is this
17:51:35	4	A. You mean the spike samples?	17:53:55	4	stated?
17:51:37	5	Q. Yes.	17:53:56	5	Q. (By Mr. Chachkes) In one of the ISO
17:51:37	6	A. Taking that one JBP, I think it's number	17:53:57	6	documents that you're referring to, does it say that
17:51:51	7	13, and then you mix the appropriate materials	17:54:00	7	this method that we're talking about consistently
17:51:53	8	together so that you get a weight percent -- a	17:54:04	8	yields an overestimate of the proportion of asbestos?
17:51:58	9	weighted percent, where you put -- say,	17:54:08	9	Are you aware of that?
17:52:02	10	hypothetically, you know, 5 grams of tremolite and	17:54:09	10	A. I don't recall that.
17:52:05	11	then you then dilute the sample with additional talc	17:54:10	11	Q. Okay. Do you believe that this
17:52:08	12	to make it .1 or .2 or .3. Standard method.	17:54:16	12	methodology we're talking about consistently yields
17:52:13	13	Q. Okay. Did you produce those generated	17:54:18	13	an overestimate of the proportion of asbestos?
17:52:16	14	calculations?	17:54:20	14	A. No.
17:52:17	15	A. No.	17:54:20	15	Q. Did your analyst use a point counting
17:52:18	16	Q. Okay. We request that you produce those.	17:54:45	16	method?
17:52:20	17	In your report you write that for positive	17:54:46	17	A. No.
17:52:25	18	samples a visual estimation of the quantity of	17:54:46	18	Q. ISO 22262-2 includes a method for point
17:52:28	19	asbestos observed was based on eye calibration	17:54:51	19	counting by PLM; correct?
17:52:32	20	through review of lab-generated weight percentage	17:54:53	20	A. It does.
17:52:36	21	standards.	17:54:54	21	Q. So instead of following the point counting
17:52:36	22	Does that ring a bell?	17:55:01	22	method in ISO 22262-2, you used an estimation based
17:52:38	23	A. Yes.	17:55:07	23	on eyeball?
17:52:38	24	Q. What is eye calibration?	17:55:10	24	MR. CIRSCH: Form.
17:52:39	25	A. It's a petrographic term for when you're	17:55:11	25	THE WITNESS: Estimation-based typical PLM
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17:55:12 1 analysis, that's also in the 22262-1. They give
 17:55:16 2 you both, the ability to do either one.

17:55:19 3 Q. (By Mr. Chachkes) I'm talking about
 17:55:21 4 22262-2, is there the eyeballing method in 22262-2?
 17:55:27 5 MR. CIRSCH: Object to form.

17:55:27 6 THE WITNESS: We only do the section 16,
 17:55:30 7 section 14 in the counting rules for TEM in the
 17:55:35 8 ISO 22262-2.

17:55:37 9 Q. (By Mr. Chachkes) So is it your opinion
 17:55:38 10 that the ISO 22262-2 point counting method is not
 17:55:44 11 required; it's just merely optional?

17:55:48 12 A. **22262, if you are going to do PLM, it goes**
 17:55:52 13 **back to the 1, and it provides you the ability to do**
 17:55:55 14 **either/or.**

17:55:56 15 Q. Okay. So it's your opinion that point
 17:55:59 16 counting in 22262-2 is optional?

17:56:03 17 MR. CIRSCH: Object to form.

17:56:03 18 THE WITNESS: You're going to have to show
 17:56:05 19 me where the point counting is in 22262-2.

17:56:09 20 Q. (By Mr. Chachkes) Okay. Sitting here
 17:56:10 21 today, rather than burning the time on that, do you
 17:56:16 22 have any reason to believe it's not optional, that it
 17:56:18 23 was required, you just didn't do it?

17:56:20 24 MS. O'DELL: Object to the form.

17:56:21 25 THE WITNESS: No, I don't believe that.

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17:56:23 1 Q. (By Mr. Chachkes) Okay. Do you have any
 17:56:23 2 reason to believe it's optional and so you had the
 17:56:28 3 option of not going it?

17:56:29 4 MS. O'DELL: Object to form.

17:56:30 5 MR. CIRSCH: Object to form.

17:56:30 6 THE WITNESS: We follow the 22262-1 PLM
 17:56:34 7 method. It provides the ability to do both
 17:56:37 8 types of estimation. And point counting is
 17:56:41 9 another type of estimation.

17:56:43 10 Q. (By Mr. Chachkes) For those particles
 17:56:44 11 that you determined were asbestosiform in your report,
 17:56:48 12 for each one, is it your opinion that these are
 17:56:51 13 minerals with a fibrosity in which the fibers and
 17:56:57 14 fibrils possess a high tensile strength and
 17:57:00 15 flexibility?

17:57:01 16 MR. CIRSCH: Object to form.

17:57:01 17 MS. O'DELL: Would you repeat that,
 17:57:02 18 please?

17:57:03 19 MR. CHACHKES: Can you read that back?
 17:57:24 20 (The record was read by the reporter.)

17:57:24 21 MR. CIRSCH: Object to form.

17:57:25 22 THE WITNESS: Again -- I guess we could
 17:57:27 23 rehash this -- that is a general definition.

17:57:29 24 The protocol does not provide you any
 17:57:31 25 methodology to determine high tensile strength

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17:57:35 1 or any tensile strength.

17:57:38 2 It does not define what high is. It does
 17:57:40 3 not define how you determine flexibility on a
 17:57:43 4 microscopic scale.

17:57:45 5 I guess that is just an opinion of
 17:57:48 6 somebody taking a look at it. But it's not
 17:57:51 7 required for this analysis.

17:57:53 8 Q. (By Mr. Chachkes) I'm not asking a
 17:57:55 9 question at all about what's required. I'm asking
 17:57:57 10 about what your opinion is. Do the fibers you
 17:58:02 11 identified as asbestosiform in your report possess high
 17:58:06 12 tensile strength and flexibility?

17:58:08 13 MR. CIRSCH: Object to form.

17:58:09 14 Q. (By Mr. Chachkes) Did you determine that?

17:58:10 15 A. **You can't determine it. The protocol**
 17:58:12 16 **doesn't tell you how to determine it. It doesn't**
 17:58:14 17 **provide any guidance on how to determine it. It**
 17:58:16 18 **doesn't tell you what, quote, high tensile strength**
 17:58:20 19 **is.**

17:58:21 20 **High tensile strength to me, personally,**
 17:58:21 21 **probably 100 psi. I don't think that's what they**
 17:58:25 22 **mean, but at least there should be some guidance of**
 17:58:28 23 **some sort to say, okay, somehow you have to put an**
 17:58:30 24 **Instron inside your optical microscope and grab a**
 17:58:35 25 **microscopic bundle and put it in the Instron and then**

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17:58:37 1 Q. **measure the tensile strength, and it has to be over**
 17:58:41 2 **5,000 psi. None of that exists.**

17:58:43 3 **A methodology is supposed to -- for a**
 17:58:46 4 **person using a methodology is step A, step B, step C,**
 17:58:51 5 **step D. There is no methodology for determining**
 17:58:55 6 **tensile strength, much less an undefined high tensile**
 17:58:58 7 **strength.**

17:58:59 8 Q. Is there anything in the published
 17:59:00 9 literature that allows a scientist to determine the
 17:59:03 10 tensile strength and flexibility of a putative
 17:59:07 11 asbestos fiber?

17:59:07 12 A. **Not individual fibers, no. There's plenty**
 17:59:10 13 **of literature that geologists walking around in a**
 17:59:15 14 **mine can make a grab sample, usually 10 to**
 17:59:18 15 **15 centimeters long, they'll tape it to paper, it's**
 17:59:21 16 **very flexible at that, and then they'll put it in an**
 17:59:24 17 **Instron and pull it, and then they can determine the**
 17:59:27 18 **tensile strength.**

17:59:28 19 Q. Have you ever heard of -- sorry.

17:59:28 20 A. **Go ahead. I'm sorry.**

17:59:30 21 Q. Did you ever hear of a PLM scientist
 17:59:33 22 looking at a sample and pushing it down and if it
 17:59:36 23 breaks versus whether it bends, that relates to
 17:59:40 24 tensile strength? Have you ever heard of that?

17:59:41 25 MR. CIRSCH: Object to form.

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1 THE WITNESS: No. There's no protocol for
17:59:42 2 that.

17:59:45 3 MR. CIRSCH: Alex, we probably should
17:59:47 4 break any time in the next few minutes, if we
17:59:50 5 can.

6 MR. CHACHKES: Yeah, we can take a break,
18:01:21 7 that's fine.

18:01:21 8 (Recess from 6:01 p.m. to 6:53 p.m.)

19:15:25 9 Q. (By Mr. Chachkes) Dr. Longo, your
19:15:52 10 analysts reported identifying cleavage fragments in
19:15:56 11 many of the samples by ISO PLM; correct?

19:15:58 12 A. Yes.

19:15:58 13 Q. How many anthophyllite cleavage fragments
19:16:01 14 did your analysts detect?

19:16:03 15 A. I don't recall them detecting any.

19:16:04 16 Q. How many tremolite cleavage fragments did
19:16:08 17 your analysts detect?

19:16:08 18 A. We just determined -- we didn't do a count
19:16:11 19 of how many cleavage fragments, only that they were
19:16:13 20 present.

19:16:14 21 Q. Did you produce the data regarding the
19:16:16 22 cleavage fragment particles in these samples?

19:16:20 23 A. I produced all the data we have. Some of
19:16:22 24 the photographs you can see some of the cleavage
19:16:26 25 fragments, others you can't.

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19:17:43 1 Q. (By Mr. Chachkes) So you see at the
19:17:44 2 bottom, this is a -- actually, what do you call this
19:17:50 3 count sheet here, this sheet, Exhibit 24?

19:17:53 4 A. It's the PLM analysis bench sheet.

19:17:56 5 Q. Okay. So this Exhibit 24, which is your
19:17:58 6 PLM analysis bench sheet for a particular sample, you
19:18:01 7 see at the bottom that both cleavage fragments and
19:18:07 8 asbestos particles were observed?

19:18:09 9 A. Yes.

19:18:10 10 Q. Okay. I see it says -- is it both
19:18:15 11 actinolite and tremolite cleavage fragments were
19:18:18 12 observed? Am I reading that right?

19:18:19 13 A. Yes.

19:18:19 14 Q. And let's go to -- and this is from your
19:18:24 15 report, pages 120 to 128 from your January report,
19:18:28 16 the analysis for bottle M68503-010-BL1; do you see
19:18:37 17 that?

19:18:37 18 A. Yes.

19:18:38 19 Q. Okay. So let's turn to the picture -- the
19:18:47 20 first picture we get to, which is I guess on page 2
19:18:50 21 of this document.

19:18:51 22 Which are cleavage fragments and which are
19:18:53 23 asbestosiform, or can you not tell?

19:18:56 24 A. Well the one that we see here that's
19:18:58 25 measured as 69 micrometers, that is asbestosiform. We
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19:16:27 1 Q. Did you quantify identified cleavage
19:16:32 2 fragments the way you quantified identified
19:16:35 3 asbestos fibers and bundles?

19:16:36 4 A. No.

19:16:37 5 Q. And you don't report on cleavage fragments
19:16:41 6 in your report; correct? I'm sorry, strike that.

19:16:45 7 You don't report on the concentration of
19:16:47 8 cleavage fragments in your report; correct?

19:16:49 9 A. I do not.

19:16:50 10 Q. Okay. And you did not take that data?

19:16:54 11 A. Other than to note that they were present.

19:16:57 12 Q. Okay. And you cannot state to a
19:17:00 13 reasonable degree of scientific certainty what the
19:17:02 14 concentration of cleavage fragments in any of these
19:17:04 15 samples were; correct?

19:17:05 16 A. We did not quantify the numbers of
19:17:09 17 cleavage fragments that were observed other than that
19:17:12 18 they were present.

19:17:13 19 MR. CHACHKES: Okay. Let's look at this
19:17:15 20 one.

19:17:19 21 All right. We're going to look at a
19:17:21 22 sample where the analyst reported both cleavage
19:17:24 23 fragments and asbestos by PLM. Let's mark 24.

24 (Defendants' Exhibit 24 was marked for
19:17:43 25 identification.)

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19:19:03 1 have many talc particles, and --

19:19:06 2 Q. How do you know which are the talc
19:19:10 3 particles?

19:19:10 4 A. I'm looking at them. Because under
19:19:13 5 dispersion staining they're usually anywhere from --
19:19:17 6 depending on the thickness of bluish to a brighter
19:19:20 7 yellow.

19:19:21 8 And potentially, one other asbestosiform
19:19:28 9 down in the lower left-hand -- next to a fairly good
19:19:35 10 size talc particle.

19:19:36 11 Q. It looks like the top of a T --

12 A. Yes --

13 Q. -- on its side?

14 A. -- that's a good description.

15 A. And as for cleavage fragments -- and I
19:19:44 16 would have to be looking in the microscope, but I
19:19:46 17 would say potentially one.

18 Q. Where?

19 A. There (indicating).

20 Q. So you're pointing to it looks like a

19:19:56 21 yellow kernel of corn somewhere center left, and
19:19:59 22 there's a very small kind of orangish stain right to
19:20:03 23 the right of it; is that what you're looking at?

19:20:05 24 A. That's what I'm saying, potentially one.

19:20:08 25 Q. Okay. What about the next page? Do you

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19:20:14 1 see any asbestosiform particles, any cleavage
19:20:17 2 fragments?
19:20:18 3 **A. Well, we're looking at the exact same**
19:20:25 4 **material. Now we're in perpendicular dispersion,**
19:20:29 5 **which you have this color change, so there's no new**
19:20:33 6 **information here.**
19:20:35 7 Q. Okay. And so what you identified in the
19:20:37 8 previous page as a potential cleavage fragment, is
19:20:40 9 that what I see, it's kind of like center, down about
19:20:43 10 halfway, above what looks like a yellow delta.
19:20:53 11 A. Yes.
19:20:57 12 Q. Okay. Looking at the purple page. Tell
19:21:15 13 me when you're there. There's something an arrow is
19:21:18 14 pointing at. What's that?
19:21:19 15 A. That's the same structure we've been
19:21:22 16 looking at. It's at a higher magnification, 200
19:21:25 17 times.
19:21:28 18 Q. Okay.
19:21:25 19 A. So that's the actinolite/tremolite
19:21:30 20 asbestos bundle, and the resolution on the elongation
19:21:35 21 with the gypsum filter, if it's 530 nanometers,
19:21:42 22 you're not resolving any of these very small
19:21:45 23 particulates.
19:21:45 24 Q. So you called it a bundle. Where are the
19:21:47 25 fibers?

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19:23:39 1 1.660 are required at intervals of 0005.
19:23:43 2 Do you see that?
19:23:45 3 A. Yes.
19:23:50 4 Q. Okay. Is it what's in 7.1.4.1 that led
19:23:57 5 you to 1.605 as the RI liquid?
19:24:01 6 A. Yes and no. Yes, it states that 1.605.
19:24:07 7 But, no, it's the common refractive indices liquid
19:24:11 8 that we use that's in the R-93, so it's one of the
19:24:14 9 common refractive indices liquids for this type of
19:24:17 10 analysis.
19:24:18 11 Q. Okay. Did you use liquids at intervals of
19:24:23 12 005?
19:24:24 13 A. No. We just use 1.605.
19:24:32 14 Q. Can RI liquid 1.605 determine whether a
19:24:38 15 particle is anthophyllite?
19:24:39 16 A. Yes.
19:24:40 17 Q. Can it be used to determine whether a
19:24:43 18 particle is talc?
19:24:44 19 A. Yes. You can determine the difference
19:24:49 20 between the talc and the anthophyllite and the
19:24:53 21 tremolite in 1.605.
19:24:55 22 You can use 1.55 if you want further
19:24:59 23 identification.
19:25:00 24 Q. What color would anthophyllite appear as
19:25:03 25 using the RI liquid 1.605?

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19:21:48 1 A. Well, you can't see it there, but you can
19:21:51 2 see the fibers in the dispersion staining on both the
19:22:03 3 perpendicular and the parallel orientations.
19:22:06 4 Q. Those are the first two pages we looked
19:22:09 5 at?
19:22:09 6 A. Yes.
19:22:09 7 Q. Okay. Explain how you selected the
19:22:17 8 refractive index liquid when you conducted -- when
19:22:21 9 you're conducting analysis.
19:22:23 10 A. The 1.605 is a common refractive indices
19:22:27 11 liquid that you can use. You can use 1.605, you can
19:22:31 12 use a 1.63 or a 1.64; but that's, in my opinion, the
19:22:38 13 most common refractive indices liquid for amphiboles.
19:22:43 14 Q. When you call it the most common, is
19:22:46 15 that -- can I find that in the peer-reviewed
19:22:48 16 literature?
19:22:48 17 A. Let's see. Would it say the most common?
19:22:58 18 I don't know. But -- you know, I won't waste time,
19:23:02 19 but in the one they'll talk about the different
19:23:09 20 refractive indices liquids. You can use others.
19:23:11 21 Q. And you're looking at Exhibit 4, which is
19:23:12 22 the 22262 part 1?
19:23:14 23 A. Yes.
19:23:14 24 Q. I'm looking at page 15 where it says,
19:23:31 25 under 7.1.4.1, RI liquids in the range of 1.605 to

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19:25:06 1 A. Under dispersion staining it's typically a
19:25:10 2 lightish gold versus a darker, yellowish gold on the
19:25:17 3 tremolite, as I recall correctly.
19:25:19 4 Q. What about talc, what color does that show
19:25:22 5 up?
19:25:22 6 A. Anywhere from very bright, like as can be
19:25:30 7 seen in this, to, depending on the thickness, to a
19:25:34 8 bluish kind of grayish color.
19:25:37 9 Q. Okay. If the talc folds up on itself,
19:25:40 10 will it appear as a different color, that part that's
19:25:43 11 folded up on itself?
19:25:44 12 A. We've never seen that, but I don't believe
19:25:46 13 so, no.
19:25:47 14 Q. Okay. Does the peer-reviewed literature
19:25:53 15 tell you what the colors will be for RI 1.605 for
19:25:57 16 anthophyllite talc and tremolite?
19:25:58 17 A. Yes. Depending on what type of microscope
19:26:04 18 you have, if it's got an angular condenser lens and
19:26:09 19 what the temperature is, you can go through the
19:26:11 20 wavelengths of light and colors and pick out the
19:26:15 21 refractive indices for these particular types of
19:26:18 22 amphiboles.
19:26:18 23 Q. Okay. Would you expect sometimes using RI
19:26:30 24 liquid 1.605 for anthophyllite to turn up as a color
19:26:32 25 that's completely different from lightish gold?

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19:26:35 1 A. Sometimes that happens, depending on the
 19:26:39 2 thickness of the bundle, because of the way it's
 19:26:43 3 transmitted through the light, so then you have to
 19:26:46 4 look more around the edges of the bundle to get the
 19:26:48 5 appropriate colors.

19:26:49 6 But I've seen it go from everything from a
 19:26:51 7 goldish yellow to a reddish to a blue when you get
 19:26:54 8 these really thick, multifiber bundles.

19:26:57 9 Q. And where can I find in the peer-reviewed
 19:27:01 10 literature this range of colors and what they
 19:27:03 11 correspond to under RI 1.605?

19:27:06 12 A. The Su article. Or any article that tells
 19:27:12 13 you how to do polarized light microscopy. You can go
 19:27:16 14 back to the early McCrone particle analysis.

19:27:31 15 MR. CHACHKES: Okay. Let's mark as the
 19:27:32 16 next Exhibit 25.

19:27:59 17 (Defendants' Exhibit 25 was marked for
 18 identification.)

19:27:59 19 Q. (By Mr. Chachkes) Okay. In your expert
 19:28:03 20 opinion, is -- this is a talc particle and an
 19:28:06 21 anthophyllite particle?

19:28:08 22 A. Well, you have one -- two talc particles
 19:28:11 23 that you can see for sure. This is out of focus.
 19:28:15 24 And then you have the anthophyllite asbestos bundle.

19:28:20 25 Q. So the -- I'm focusing on the talc
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19:29:37 1 talc.
 19:29:38 2 Q. Okay. And do you have a reference in
 19:29:44 3 mind, peer-reviewed reference, that shows you what a
 19:29:47 4 rolled up talc looks like in a PLM?
 19:29:49 5 A. I've never seen a peer-reviewed reference
 19:29:53 6 that shows what that looks like. You know, I'll
 19:29:56 7 quote from Walter McCrone himself that he's never
 19:30:01 8 seen a rolled up talc particle.

19:30:03 9 Q. And you're citing what paper?
 19:30:05 10 A. It's in my report, the reference to it,
 19:30:09 11 where he says exactly that he had -- for whatever
 19:30:12 12 reason, that I have never seen a rolled up talc
 19:30:15 13 particle.

19:30:16 14 Q. Do you know what refractive index liquid
 19:30:20 15 it takes to make the distinction between
 19:30:22 16 anthophyllite and talc?

19:30:24 17 A. You can use -- this is in 1.605.

19:30:30 18 Q. Okay. Go ahead.

19:30:32 19 A. You can use that. But if you're going to
 19:30:35 20 look just at the talc alone, you use the 1.5 fiber
 19:30:40 21 refractive indices liquid.

22 Q. Okay.

19:30:43 23 A. But you can't kind of mix and match here.
 19:30:47 24 If you're going to -- and we do that sometimes when
 19:30:48 25 there's no -- if there's no asbestiform bundles in
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19:28:25 1 particle in the center. It's your opinion that what
 19:28:28 2 happened is there's an anthophyllite fiber that has
 19:28:32 3 the exact length and is perfectly flush with the talc
 19:28:37 4 particle that happened to match perfectly that edge?

19:28:41 5 MR. CIRSCH: Object to form.

19:28:42 6 THE WITNESS: Yes.

19:28:48 7 Q. (By Mr. Chachkes) Okay. And is there a
 19:28:49 8 chance that that actually is just the rolled up edge
 19:28:51 9 of a talc?

19:28:52 10 A. No.

19:28:52 11 Q. And why do you say no?

19:28:53 12 A. Because you have some rolling here a
 19:28:56 13 little bit. But it doesn't matter if it rolls up;
 19:29:00 14 you're not going to get the same color like that.

19:29:02 15 Q. And you said that you can get a range of
 19:29:10 16 colors for anthophyllite, including red and blue.

19:29:13 17 Does the same apply for talc?

19:29:15 18 A. No, that's not what I said. I said if you
 19:29:18 19 have a very thick bundle, you're going to have the
 19:29:20 20 range of colors. And it happens with the
 19:29:22 21 actinolite/tremolite also, but you do get the primary
 19:29:25 22 colors. Once it gets to a certain thickness,
 19:29:29 23 transmitting through the light is different. So we
 19:29:33 24 have some examples of those somewhere where you can
 19:29:35 25 get the appropriate colors. That's not rolled up

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19:30:52 1 it, you'll see in some of our count sheets in there
 19:30:56 2 that it will have 1.55.

19:30:57 3 Q. But it is your opinion that you can use
 19:31:00 4 1.605 to distinguish anthophyllite and talc?

19:31:04 5 A. Correct.

19:31:05 6 Q. Okay. Is there additional data concerning
 19:31:22 7 the samples upon which you reported ISO PLM, as in a
 19:31:26 8 file somewhere in your laboratory but not printed out
 19:31:28 9 or produced?

19:31:29 10 A. I don't believe so. I tried to produce
 19:31:31 11 everything that we took.

19:31:32 12 Q. Okay. Was there any data generated in
 19:31:34 13 connection with ISO PLM analysis in this case that
 19:31:36 14 was either thrown away or deleted?

19:31:39 15 A. No.

19:31:39 16 Q. What are the differences, if any, between
 19:31:45 17 how your analysts employed the Blount method and how
 19:31:50 18 it is actually written in the 1991 article?

19:31:54 19 A. The only difference is it's unable to
 19:31:59 20 really interpret how she counts the particulates or
 19:32:03 21 if she is counting the fibers per milligram of
 19:32:06 22 material. We've looked at that.

19:32:09 23 So she gives it in numbers of fibers or
 19:32:12 24 numbers of bundles per milligram, a number count,
 19:32:15 25 which is the same thing we do, of course, in the TEM,

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19:32:19 1 **where we just follow the procedure here for the ISO**
 19:32:21 2 **22262-1 for an estimated weight percent.**
 19:32:26 3 Q. Okay. But otherwise, you followed the
 19:32:28 4 1991 Blount method to the letter?
 19:32:31 5 A. **Pretty much.**
 19:32:32 6 Q. Following the Blount concentration, your
 19:32:37 7 analysts conducted PLM pursuant to ISO 22262-1 PLM
 19:32:41 8 method; right?
 19:32:43 9 A. **That's correct.**
 19:32:43 10 Q. Blount did not use that 22262-1 PLM;
 11 correct?
 19:32:49 12 A. **No, she used a fiber count method so that**
 19:32:53 13 **if you look at her data, I think she has anywhere for**
 19:32:57 14 **that sample I, which is the Johnson & Johnson Vermont**
 19:33:02 15 **sample, 1989-1990, she finds in the range of about**
 19:33:05 16 **100 to almost 235 milligrams -- fiber/bundles per**
 19:33:11 17 **milligram. So if you multiply that by 1,000 she's**
 19:33:14 18 **finding the ranges of concentrations at the higher**
 19:33:18 19 **end that we are.**
 19:33:18 20 Q. And --
 19:33:20 21 A. **So we followed the counting rules for**
 19:33:23 22 **estimating weight percent. She did what we do into**
 19:33:27 23 **the TEM and did a number count per milligram of talc.**
 19:33:32 24 Q. Dr. Blount's paper includes a particle
 19:33:35 25 size distribution analysis; correct?
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19:34:47 1 Q. Dr. Blount included particles in her
 19:34:50 2 particle size distribution that were below the 3-to-1
 19:34:53 3 aspect ratio; correct?
 19:34:54 4 A. **That's correct.**
 19:34:54 5 Q. Do you have any other opinions regarding
 19:34:57 6 Dr. Blount's 1990 or 1991 papers in this case beyond
 19:35:01 7 those expressed in your report and that we just
 19:35:03 8 discussed?
 19:35:03 9 A. **No.**
 19:35:04 10 Q. Is additional data concerning the samples
 19:35:08 11 upon which you reported for Blount PLM in a file
 19:35:11 12 somewhere in your laboratory but not printed out and
 19:35:13 13 produced?
 19:35:14 14 A. **No. We've produced everything that we**
 19:35:17 15 **generated for the MDL.**
 19:35:19 16 Q. Okay. And all data and material
 19:35:22 17 information generated about your work for the Blount
 19:35:25 18 PLM was produced?
 19:35:27 19 MS. O'DELL: Object to the form.
 19:35:28 20 THE WITNESS: As far as I know, everything
 19:35:29 21 was produced for all the data we collected for
 19:35:32 22 the MDL samples.
 19:35:34 23 Q. (By Mr. Chachkes) Okay. And I think I
 19:35:35 24 already know the answer, but I'm going to ask it.
 19:35:37 25 And any of the data you generated for your Blount PLM
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19:33:39 1 A. **Particle size distribution analysis for**
 19:33:41 2 **the length and size of the asbestos -- tremolite**
 19:33:45 3 **asbestos she was finding in the PLM, yes.**
 19:33:47 4 Q. And she plotted the aspect ratios of the
 19:33:50 5 particles she viewed by PLM?
 19:33:53 6 A. **The fibrous asbestos, yes, she did.**
 19:33:55 7 Q. She did this because asbestos has a
 19:33:57 8 characteristic distribution?
 19:34:00 9 A. **Milled tremolite has a characteristic**
 19:34:04 10 **distribution, yes.**
 19:34:04 11 Q. Okay. And the nonasbestiform version of
 19:34:09 12 the same amphibole has a different characteristic
 19:34:13 13 distribution?
 19:34:13 14 A. **Yes, it does.**
 19:34:14 15 Q. And you did not generate a particle size
 19:34:17 16 distribution chart like the one in Blount's paper --
 19:34:22 17 the ones in Blount's paper in your report?
 19:34:23 18 A. **Not for the MDL samples, no. We did for**
 19:34:26 19 **the original analysis so that we could compare it to**
 19:34:29 20 **the NIST tremolite asbestos standard, to Blount's**
 19:34:34 21 **particle size, as well as the Campbell particle size.**
 19:34:39 22 Q. You included a table with average particle
 19:34:43 23 size that your analysts recorded by TEM, however,
 19:34:46 24 though; right?
 19:34:46 25 A. **Correct.**
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19:35:40 1 analysis, was any of it thrown away or deleted?
 19:35:43 2 A. **No. We have many negatives, we have many**
 19:35:47 3 **positives, so we just reported what we saw.**
 19:35:50 4 Q. In your report at page 8 you state that
 19:35:53 5 you found fibrous talc in 98 percent of the Italian
 19:35:56 6 and Vermont talc samples by ISO 22262-1; correct?
 19:36:00 7 A. **That's correct.**
 19:36:00 8 Q. What's your definition of fibrous talc?
 19:36:03 9 A. **Has greater than .5 micrometers in length,**
 19:36:08 10 **has parallel sides, and it has at least 5-to-1 aspect**
 19:36:12 11 **ratio.**
 19:36:12 12 Q. Is there a scientific consensus that there
 19:36:17 13 is such a thing as fibrous talc?
 19:36:21 14 MR. CIRSCH: Object to form.
 19:36:22 15 THE WITNESS: I don't believe so.
 19:36:22 16 Q. (By Mr. Chachkes) Are you aware of any
 19:36:23 17 epidemiologist or doctor who has studied the health
 19:36:26 18 effects of fibrous talc?
 19:36:28 19 A. **I don't testify about health effects of**
 19:36:30 20 **fibrous talc or regulated asbestos, so I don't have**
 19:36:33 21 **any opinions about that one way or the other if**
 19:36:35 22 **anybody has studied it. That's not my area.**
 19:36:37 23 Q. You were disclosed for health and
 19:36:39 24 regulatory definitions of talc; correct?
 19:36:41 25 MS. O'DELL: Object to the form.
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1 THE WITNESS: I don't believe so.
 19:36:42 2 Q. (By Mr. Chachkes) Okay. And you're not
 19:36:45 3 here to testify about health and regulatory
 19:36:48 4 definitions of talc?
 19:36:49 5 **A. I'm not testifying that fibrous talc has**
 19:36:52 6 **any impact on the human body whatsoever.**
 19:36:55 7 Q. Are you aware of any regulatory
 19:36:57 8 definitions of fibrous talc?
 19:37:00 9 **A. Fibrous talc for the protocols that we**
 19:37:05 10 **follow is not deemed a regulated asbestos fiber. We**
 19:37:10 11 **just follow the same counting rules that we do for**
 19:37:13 12 **asbestos to characterize what we're looking at.**
 19:37:18 13 Q. So ISO 22262, parts 1 through 3, they
 19:37:22 14 don't define fibrous talc; correct?
 19:37:25 15 **A. They define anything that is an elongated**
 19:37:28 16 **structure and fibrous that if you care to write down**
 19:37:33 17 **your findings you could put it in.**
 19:37:35 18 Q. So they define fibrous talc in that way?
 19:37:37 19 **A. They define elongated fiber materials that**
 19:37:42 20 **you're going to -- if you wish to count into the TEM,**
 19:37:46 21 **any elongated structure.**
 19:37:48 22 Q. Okay. And so it's your testimony that ISO
 19:37:55 23 22262 was meant as a method to count fibrous talc?
 19:38:01 24 MR. CIRSCH: Object to form.
 19:38:01 25 THE WITNESS: I didn't say that.

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19:38:02 1 Q. (By Mr. Chachkes) Is it a method to count
 19:38:03 2 fibrous talc? Is it meant as such as method?
 19:38:06 3 MR. CIRSCH: Object to form.
 19:38:07 4 THE WITNESS: I don't know what it was
 19:38:08 5 meant for, but it gives you the tools if you
 19:38:10 6 wish to do that. They don't restrict what you
 19:38:13 7 can or can't count. Nowhere in the method does
 19:38:16 8 it say don't count the fibrous talc.
 19:38:19 9 Q. (By Mr. Chachkes) And can you identify
 19:38:26 10 anywhere where there's a method and a peer-reviewed
 19:38:30 11 literature or peer-reviewed publication where it
 19:38:34 12 expressly refers to fibrous talc and a method to
 19:38:36 13 count fibrous talc?
 19:38:38 14 **A. All the methods allow you to do that.**
 19:38:42 15 Q. Yeah, I'm not asking about what methods
 19:38:44 16 allow you --
 19:38:45 17 **A. You interrupted me.**
 18 Q. Okay.
 19:38:46 19 **A. It's late.**
 19:38:47 20 **All the methods give you the tools to do**
 19:38:49 21 **that if you wish. No method out there says do not**
 19:38:52 22 **count this particular type of structure. Just like**
 19:38:55 23 **in Blount, where she counted the particulates and**
 19:38:58 24 **tried to get a ratio of how many amphibole asbestos**
 19:39:01 25 **was for every number of particulates. The**

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19:39:04 1 **information doesn't change because somebody doesn't**
 19:39:07 2 **say one way or the other if you should do it.**
 19:39:10 3 Q. It's a simple question, if you would
 19:39:12 4 answer the question I'm actually asking, which is is
 19:39:15 5 there a published or peer-reviewed document that you
 19:39:17 6 can point me to that expressly talks about a way to
 19:39:21 7 count fibrous talc?
 19:39:22 8 MR. CIRSCH: Object to form.
 19:39:23 9 Q. (By Mr. Chachkes) Putting aside whether
 19:39:25 10 you can use some other method that doesn't say the
 19:39:28 11 phrase fibrous talc -- to count fibrous talc, is
 19:39:30 12 there something that expressly refers to fibrous talc
 19:39:32 13 and a method to count it?
 19:39:34 14 MR. CIRSCH: Object to form.
 19:39:35 15 THE WITNESS: I'd have to go back and
 19:39:37 16 relook. None of the methods say do not count
 19:39:39 17 fibrous talc.
 19:39:41 18 Q. (By Mr. Chachkes) Sitting here -- okay.
 19:39:42 19 MR. CIRSCH: Let him finish.
 19:39:44 20 THE WITNESS: None of the methods say do
 19:39:46 21 not count fibrous talc.
 19:39:47 22 Q. (By Mr. Chachkes) Yes, you said that many
 19:39:49 23 times. I'm --
 19:39:49 24 MR. CIRSCH: You're interrupting him
 19:39:51 25 again. Stop. Stop.

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19:39:52 1 THE WITNESS: Let me start over. I lost
 19:39:54 2 my train of thought.
 19:39:55 3 None of the methods say do not count
 19:39:57 4 fibrous talc. The 7402 -- NIOSH 7402
 19:40:01 5 specifically says if it's fibrous talc, count
 19:40:05 6 it, in TEM. That's one. And I'll have to --
 19:40:08 7 Q. (By Mr. Chachkes) So --
 19:40:10 8 MR. CIRSCH: You keep interrupting him.
 19:40:12 9 MR. CHACHKES: I'm asking just to save --
 19:40:12 10 MS. O'DELL: No, you're interrupting him.
 19:40:14 11 MR. CIRSCH: You keep doing it, Alex.
 19:40:16 12 THE WITNESS: So that's one.
 19:40:17 13 Q. (By Mr. Chachkes) NIOSH?
 19:40:18 14 **A. NIOSH 7402 TEM method, where you're**
 19:40:20 15 **determining the percentage of asbestos -- regulated**
 19:40:24 16 **asbestos defined by the counting rules versus other**
 19:40:27 17 **things, and it actually has talc in there.**
 19:40:30 18 Q. Okay. So in there I can look, and it will
 19:40:32 19 say here's how you count fibrous talc?
 19:40:35 20 **A. I don't think they put it that simply.**
 19:40:38 21 **But if you have knowledge about the protocols and**
 19:40:41 22 **read through it, you would understand.**
 19:40:43 23 Q. Okay. Putting aside whether there are
 19:40:46 24 documents that don't expressly say you can't use them
 19:40:50 25 for this purpose, is there a document that says this

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19:40:53 1 is how you count fibrous talc, using the phrase
 19:40:56 2 fibrous talc?
 19:40:57 3 **A. They all say it because they say this is**
 19:40:59 4 **how you define a fiber. Then how you identify what**
 19:41:03 5 **that fiber is, you can make that decision. But every**
 19:41:06 6 **one of these TEM protocols say this is the definition**
 19:41:09 7 **of a fiber.**

19:41:10 8 Q. Putting aside protocols and publications
 19:41:16 9 that talk about fibers generally, and putting aside
 19:41:18 10 your continued insistence on talking about things
 19:41:21 11 that don't say something, is there something that
 19:41:23 12 actually says this is how you count fibrous talc,
 19:41:27 13 using the phrase fibrous talc?

19:41:29 14 MR. CIRSCH: Object to form.

19:41:33 15 THE WITNESS: It is my opinion that they
 19:41:34 16 all give you the tools to count fibrous talc.
 19:41:37 17 Do they actually say what every mineral --
 19:41:39 18 elongated particle mineral is that you should or
 19:41:42 19 should not count? I'd have to go back and
 19:41:44 20 check.

19:41:45 21 I'm going to give you the same answer for
 19:41:47 22 the same question. They all provide you the
 19:41:49 23 tools or the counting procedures to count
 19:41:53 24 whatever elongated particle you want and
 19:41:56 25 identify it.

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19:42:26 1 MS. O'DELL: CMO 11, as you know, Alex,

19:42:32 2 requires you to --

19:42:34 3 MR. CHACHKES: I'm sorry, are you
 19:42:35 4 testifying about a document?

19:42:36 5 MS. O'DELL: I'm telling you what the
 19:42:37 6 order says.

7 MR. CHACHKES: Oh, okay. I'm sorry.

19:42:38 8 MS. O'DELL: You may not be aware of the
 19:42:39 9 order since you've not appeared in the MDL, but
 19:42:42 10 it says to --

11 MR. CHACHKES: Actually --

12 MS. O'DELL: -- treat the witness with
 19:42:44 13 civility and respect.

14 He's answered your question, and you
 19:42:47 15 should stop badgering him.

16 MR. CHACHKES: Okay. Your objection's
 19:42:51 17 been made.

18 Q. (By Mr. Chachkes) Are fibrous talc and
 19:42:53 19 asbestos talc different?

19:42:55 20 A. No.

21 Q. In your report at page 30 you write that
 19:43:03 22 others have reported that fibrous talc is a
 19:43:06 23 geological metamorphic transformation of
 19:43:09 24 anthophyllite to fibrous talc?

19:43:11 25 A. Yes.

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19:41:56 1 Q. (By Mr. Chachkes) So sitting here today,
 19:41:57 2 you can't tell me a counting protocol that expressly
 19:42:01 3 mentions this is how you count, mentioning the phrase
 19:42:04 4 fibrous talc?

19:42:06 5 MR. CIRSCH: Object to form. He's
 19:42:07 6 answered the question. I instruct him not to
 19:42:09 7 answer any further.

19:42:11 8 MR. CHACHKES: You're instructing him not
 19:42:12 9 to answer?

19:42:13 10 MR. CIRSCH: He answered the question. I
 19:42:13 11 mean, you're badgering him now with the same
 19:42:15 12 question over and over again.

13 MR. CHACHKES: I'm asking a different
 19:42:17 14 question.

19:42:17 15 MS. O'DELL: Alex, I'm sure you're
 19:42:19 16 aware --

19:42:20 17 MR. CHACHKES: Who's objecting here?

19:42:21 18 MS. O'DELL: I'm objecting right here, and
 19:42:23 19 I'm sure you're aware --

19:42:22 20 MR. CHACHKES: Okay. Can we just keep it
 19:42:24 21 to one person? It's a much more controlled
 19:42:25 22 environment when we do that.

19:42:25 23 MS. O'DELL: Let me -- don't interrupt me.

24 MR. CHACHKES: Okay. Wait. Which Lee is
 19:42:26 25 objecting?

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19:43:12 1 Q. Okay. And then you cite a couple of
 19:43:15 2 things. There's an MVA report -- two MVA reports,
 19:43:19 3 right? You can go to page 30, footnotes 42, 43.

19:43:28 4 A. **It should be reference 30, Virta, The**
 19:43:44 5 **Phase Relationship of Talc and Amphiboles in a**
 19:43:47 6 **Fibrous Talc Sample, Bureau of Mines report is one.**

19:43:50 7 **Veblen, 29, New Bio -- it's late -- I**
 19:43:56 8 **can't even pronounce it -- Biopyriboles, Chester,**
 19:44:00 9 **Vermont, talks about the polymorph transformation.**

19:44:06 10 **That's how fibrous talc is generated --**

11 Q. Okay.

12 A. **-- is the -- during way back when, during**
 19:44:11 13 **pressure and temperature, when you had the liquid**
 19:44:12 14 **rock and -- depending on the minerals. Those are two**
 19:44:16 15 **references and there's others. I didn't put all of**
 19:44:19 16 **them in there.**

17 Q. Okay. Let's talk about two references you

19:44:21 18 did put in. You put in two references to MVA

19:44:24 19 reports, footnotes 42 and 43; correct?

19:44:55 20 Am I correct that 42 and 43 --

19:44:58 21 A. **You are correct.**

19:44:58 22 Q. Okay. And those are reports prepared for

19:45:01 23 plaintiffs in talc litigation?

19:45:05 24 MR. CIRSCH: Object to form.

19:45:06 25 THE WITNESS: That's my understanding.

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19:45:06 1 Q. (By Mr. Chachkes) Okay. In your footnote
 19:45:09 2 42, you have the date of the MVA report as 2018, but
 19:45:14 3 it was actually from 2017; correct?
 19:45:18 4 A. **That's correct.**
 19:45:18 5 Q. These MVA reports you cite in footnotes 42
 19:45:22 6 and 43, those were not published; correct?
 19:45:24 7 A. **No, sir.**
 19:45:25 8 Q. And they're not peer-reviewed?
 19:45:27 9 A. **As far as I know, they haven't been
 19:45:30 10 published.**
 19:45:30 11 Q. And they're not peer-reviewed, are they?
 19:45:33 12 A. **Well, if you're talking about
 19:45:34 13 peer-reviewed in a publication, no.**
 19:45:36 14 Q. Okay. Is there another form of peer
 19:45:41 15 review you're aware of?
 19:45:42 16 A. **Well, any time anybody looks over a report
 19:45:46 17 and writes comments about it, it's peer-reviewed.**
 19:45:49 18 Q. So would you call your expert report in
 19:45:51 19 this case peer-reviewed?
 19:45:53 20 A. **No, sir.**
 19:45:55 21 Q. Didn't Rigler look over it?
 19:45:58 22 A. **I'm talking about peer review where people
 19:46:00 23 are looking for the scientific validity of it. It's
 19:46:05 24 not -- as far as I know, the MVA talc analysis has
 19:46:09 25 not been published.**

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19:46:10 1 Q. Okay. And as far as you know, you don't
 19:46:13 2 have any information that it's been peer-reviewed?
 19:46:15 3 MR. CIRSCH: Object to form.
 19:46:16 4 THE WITNESS: You know, I'll give you
 19:46:17 5 that. That's correct.
 19:46:17 6 Q. (By Mr. Chachkes) What is MVA? What does
 19:46:21 7 it stand for?
 19:46:22 8 A. **Millette, Vander Wood & Associates.**
 19:46:24 9 Q. And both of these reports were authored by
 19:46:27 10 Dr. Steve Compton?
 19:46:28 11 A. **Yes, sir.**
 19:46:28 12 Q. And you've testified in cases with
 19:46:30 13 Dr. Compton before; correct?
 19:46:31 14 A. **I understand he's been in the same cases
 19:46:33 15 as me.**
 19:46:34 16 Q. On plaintiffs' side?
 19:46:35 17 MR. CIRSCH: Object to form.
 19:46:36 18 THE WITNESS: Yes, sir.
 19:46:36 19 Q. (By Mr. Chachkes) Okay. He's also an
 19:46:38 20 expert for plaintiffs' attorneys in asbestos
 19:46:40 21 litigation?
 19:46:41 22 A. **He has.**
 19:46:41 23 Q. Describe how your analysts utilized
 19:46:49 24 process blanks in their analysis.
 19:46:51 25 A. **Every set of samples that are prepared, a**

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19:46:56 1 **process blank is prepared along with it so that
 19:46:59 2 everything is done exactly the same except no talc.
 19:47:03 3 And then those samples are run through the whole
 19:47:07 4 preparation process, and then they are analyzed in
 19:47:09 5 the same manner as the talc samples.**
 19:47:13 6 Q. Do your analysts run a process blank with
 19:47:16 7 every single individual sample?
 19:47:17 8 A. **No. Every set of samples that are all
 19:47:20 9 prepared at the same time.**
 19:47:21 10 Q. Okay. And so for the MDL samples, what
 19:47:24 11 would constitute a set in that context?
 19:47:28 12 A. **Let me look, because Rigler can talk about
 19:47:48 13 it more tomorrow.**
 19:48:02 14 **So we have a number of blanks, and
 19:48:06 15 typically we have a chart that shows which process
 19:48:12 16 blanks go to which set of samples.**
 19:48:22 17 **I'll see if Rigler can bring that
 19:48:23 18 tomorrow.**
 19:48:30 19 **I don't have that information. Typically
 19:48:32 20 we give that.**
 19:48:32 21 Q. Why do you say Rigler can bring it
 19:48:36 22 tomorrow? Was he involved in that process?
 19:48:38 23 A. **Well, he was involved putting this report
 19:48:40 24 together. And since he's coming tomorrow, maybe he
 19:48:43 25 can get in early enough to say which set of samples**

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19:48:46 1 **were analyzed for each process blank.**
 19:48:49 2 Q. Sitting here today, even with the report
 19:48:51 3 before you, you can't tell me that?
 19:48:53 4 A. **No, I don't see the chart that we have
 19:49:01 5 prepared in the past.**
 19:49:03 6 Q. Do your analysts run a process blank with
 19:49:06 7 every sample analyzed by PLM?
 19:49:08 8 A. **Well, you don't have anything that you're
 19:49:12 9 generating. A process blank would literally be
 19:49:17 10 putting the glass slide on the polarized light
 19:49:20 11 microscope and looking at it because you're not
 19:49:20 12 filtering anything, you're not using reagents, so
 19:49:24 13 there's no such thing as a process blank in polarized
 19:49:27 14 light microscopy.**
 19:49:27 15 Q. Okay. Does the ISO method provide a
 19:49:35 16 process blank protocol?
 19:49:38 17 A. **I don't think so.**
 19:49:39 18 Q. Do you follow a process blank procedure
 19:49:42 19 pursuant to your lab's standard protocols?
 19:49:44 20 A. **Yes.**
 19:49:44 21 Q. Is that written down somewhere?
 19:49:48 22 A. **I believe so.**
 19:49:49 23 Q. All right. We would request that be
 19:49:52 24 produced.
 19:49:52 25 Turning back to your TEM process blanks,

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19:49:55 1 in your January 2019 report you write that, The
 19:49:58 2 process laboratory blanks were prepared in the exact
 19:50:02 3 manner as the talc samples but without any talc
 19:50:04 4 material.

19:50:05 5 Does that sound familiar?

19:50:06 6 A. **It does.**

19:50:07 7 Q. Okay.

19:50:08 8 A. **I wrote it.**

19:50:09 9 Q. Was the first step in your process blank
 19:50:10 10 protocol centrifuging a centrifuge tube with just
 19:50:15 11 heavy liquid and no talc in it?

19:50:17 12 A. **Correct.**

19:50:18 13 Q. The first step of your process blank
 19:50:19 14 protocol test tests both -- does it test both the
 19:50:25 15 centrifuge tube and the heavy liquid for
 19:50:27 16 contamination?

19:50:28 17 A. **Well, since it's in the centrifuge tube,**
 19:50:31 18 **whatever it's touched would be -- you would be**
 19:50:33 19 **measuring that potential for contamination.**

19:50:36 20 Q. It follows that your process blank
 19:50:39 21 protocol did not include the portion of your method
 19:50:41 22 before centrifugation where you transferred the
 19:50:44 23 samples to a balance to be weighed?

19:50:46 24 A. **Since we're putting no talc in it, that's**
 19:50:49 25 **correct.**

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19:50:49 1 Q. If there was a contamination on the scale,
 19:50:52 2 that would not be accounted for in the process blank
 19:50:54 3 protocol; correct?

19:51:00 4 A. **If. Well, there's no evidence that**
 19:51:04 5 **there's an if in the scale. It's not just taken out**
 19:51:09 6 **and poured onto the scale. You use weigh paper.**
 19:51:13 7 **They're very careful about that.**

19:51:16 8 **But there is -- so there's no**
 19:51:19 9 **contamination from the scale.**

19:51:20 10 Q. But it's fair to say the process blank
 19:51:23 11 protocol does not account for potential contamination
 19:51:25 12 on the scale, putting aside whether there's
 19:51:27 13 contamination or not?

19:51:28 14 A. **The process blank is everything that is**
 19:51:30 15 **touched: the liquid, the filtration, the filter, the**
 19:51:37 16 **centrifuge tube, the additional material, the**
 19:51:46 17 **apparatus that holds the filter, all that is checked.**

19:51:50 18 Q. My question's about what wasn't checked.
 19:51:53 19 Was the scale checked with the process blank
 19:51:55 20 protocol?

19:51:56 21 A. **You can't check the scale.**

19:51:57 22 Q. Okay. When you ran your process blanks,
 19:52:00 23 that process did not involve scraping samples out of
 19:52:03 24 the MCT tubes; right?

19:52:09 25 A. **Scraping samples out of the MC tube -- the**

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19:52:19 1 **tube is cut with a guillotine. The centrifuge tube**
 19:52:24 2 **is cut with a guillotine. There's no scraping for**
 19:52:26 3 **the TEM.**

19:52:27 4 Q. When you ran your process blanks, the
 19:52:30 5 process did not involve taking material out of the
 19:52:33 6 MCT tubes; right?

19:52:35 7 A. **Sure, it did. It's the same way we take**
 19:52:38 8 **the material out when we do the TEM analysis for the**
 19:52:41 9 **process blanks. The end of the tube is cut where the**
 19:52:45 10 **heavy materials -- the heavy minerals are, and then**
 19:52:49 11 **it's run the exact same way.**

19:52:51 12 Q. Okay. So the process blank protocol did
 19:52:52 13 include the portion of your method where you scraped
 19:52:54 14 the centrifuge from the tube which is --

19:52:56 15 A. **It's not scraped.**

19:52:57 16 MR. CIRSCH: Object to form.

19:52:58 17 THE WITNESS: There's no scraping.

19:52:59 18 Q. (By Mr. Chachkes) Okay.

19:53:00 19 A. **The tip is cut with a guillotine after**
 19:53:02 20 **it's been flash frozen in liquid nitrogen, and then**
 19:53:07 21 **that whole tip is put into a solution and then**
 19:53:08 22 **washed. There's no scraping.**

19:53:09 23 Q. I'll pick a more palatable verb.

19:53:13 24 It follows that -- so you're saying your
 19:53:14 25 process blank protocol included the portion of your

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19:53:15 1 method where you removed from the centrifuge the
 19:53:22 2 material with a spatula?

19:53:27 3 A. **There's no removing from the centrifuge**
 19:53:29 4 **tube after the spin-down with a spatula.**

19:53:34 5 Q. Do you just leave the material in the
 19:53:36 6 centrifuge?

19:53:36 7 A. **We cut the tip of -- the very bottom of**
 19:53:38 8 **the centrifuge tube off for TEM analysis, and then**
 19:53:41 9 **that whole tip is transferred inside and outside into**
 19:53:44 10 **the solution that is then going to be filtered where**
 19:53:47 11 **you dilute the heavy liquid density material, as we**
 19:53:50 12 **do with the TEM analysis.**

19:53:53 13 Q. What percentage of MAS's work is testing
 19:53:55 14 talc for asbestos?

19:53:56 15 A. **A lot.**

19:54:02 16 Q. Over 80 percent?

19:54:03 17 A. **I would say right now that our revenue is**
 19:54:06 18 **approximately 70 percent of talc analysis and**
 19:54:09 19 **everything associated with it.**

19:54:10 20 Q. Is the remaining --

19:54:12 21 MR. CIRSCH: I don't know if he was --
 19:54:13 22 were you done?

19:54:13 23 THE WITNESS: Yeah.

19:54:13 24 Q. (By Mr. Chachkes) Is the remaining
 19:54:15 25 percentage primarily testing asbestos?

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19:54:19 1 A. **Very small percentage of that. Other**
 19:54:24 2 **stuff that we do.**

19:54:24 3 Q. I'm sorry.

19:54:26 4 A. **Other nonlitigation projects that we do.**

19:54:29 5 Q. Of the 30 percent of your work that isn't
 19:54:33 6 testing talc for asbestos, is that -- what's that
 19:54:37 7 30 percent? What are you testing for?

19:54:38 8 A. **Well, we do -- like today, I mean, the**
 19:54:46 9 **analysts have around 100 regular, everyday PLM. It's**
 19:54:49 10 **testing for asbestos but not litigation related.**

19:54:51 11 Q. Okay. My question didn't really relate to
 19:54:54 12 litigation related or not.

19:54:56 13 Of the percentage of your work that's not
 19:54:57 14 related to testing talc for asbestos, which is in the
 19:55:01 15 range of 30 percent, is it primarily testing other
 19:55:03 16 things for asbestos? Strike that. That was a
 19:55:08 17 terrible question.

19:55:08 18 For the 30 percent of MAS's work that is
 19:55:13 19 not testing talc for asbestos, is that remainder
 19:55:17 20 primarily testing for asbestos in other materials or
 19:55:21 21 testing asbestos itself?

19:55:22 22 A. **Well, let me back up. All our litigation**
 19:55:24 23 **work is approximately 70 percent. I would say talc**
 19:55:29 24 **is approximately, of that 70 percent, maybe 35,**
 19:55:33 25 **40 percent.**

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19:59:51 1 Q. Okay. And of the 70 percent, roughly half
 19:59:54 2 of that is talc related, the other half is roughly
 19:59:57 3 asbestos litigation related?

19:59:59 4 A. **Correct.**

19:59:59 5 Q. Okay. And of the 30 percent that's not
 20:00:02 6 litigation related, what percentage of that is
 20:00:06 7 related to testing for asbestos in any context?

20:00:09 8 A. **Well, that would be encompassed in the**
 20:00:11 9 **70 percent. So I haven't broken that out, but the**
 20:00:15 10 **other 30 percent is things like VOC testing for**
 20:00:18 11 **consumer reports or just materials analysis or**
 20:00:23 12 **projects.**

20:00:25 13 Q. Just -- what's VOC?

14 A. **Hmm?**

20:00:28 15 Q. I don't know what VOC is.

20:00:30 16 A. **Oh. Volatile organic compounds. It's**
 20:00:34 17 **green labeling, furniture testing, pharmaceutical**
 20:00:38 18 **work for our FDA certification -- not certification**
 20:00:41 19 **but our FDA lab number.**

20:00:44 20 Q. So --

20:00:46 21 MR. CIRSCH: Were you done, Bill?

20:00:47 22 THE WITNESS: Yes.

20:00:48 23 (By Mr. Chachkes) I recall that I had
 20:00:49 24 asked you a question about when you did the testing
 20:00:51 25 for the samples in your report, and you said

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19:55:35 1 **And then the other portion of that**
 19:55:38 2 **70 percent would be other litigation, other asbestos**
 19:55:41 3 **testing, non-talc work. And then we have 30 or**
 19:55:45 4 **35 percent nonasbestos work.**

19:55:48 5 **Can we go off the record for a minute?**

19:55:50 6 MR. CHACHKES: Sure.

19:55:50 7 (Off the record.)

19:56:09 8 (Recess from 7:56 p.m. to 7:58 p.m.)

19:58:45 9 Q. (By Mr. Chachkes) What was the
 19:59:03 10 approximate dates when MAS tested the samples that
 19:59:05 11 are discussed in your January 2019 report, from
 19:59:09 12 approximately what date to what date?

19:59:11 13 A. **You can look through the chain of**
 19:59:12 14 **custodies or look through the -- but I think it was**
 19:59:17 15 **like November, December, October, maybe.**

19:59:21 16 **And I want to circle back for a second**
 19:59:26 17 **just to clarify. I misspoke earlier. The 70 percent**
 19:59:29 18 **is not talc litigation or talc testing. It's**
 19:59:33 19 **approximately 30, 35 percent of what we do. The**
 19:59:36 20 **remaining 30 percent is nonlitigation work. So I**
 19:59:41 21 **know I misspoke earlier.**

19:59:42 22 Q. Okay. Just to make sure the record's
 19:59:46 23 clear, so you're saying about 70 percent of your work
 19:59:48 24 is litigation related, about 30 is not?

19:59:50 25 A. **Correct.**

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20:00:54 1 November, October, December?

20:00:56 2 A. **It's all in the reports. You can go**
 20:00:58 3 **through the chain of custodies, you can see the dates**
 20:01:01 4 **on the analysis.**

20:01:01 5 Q. And what year? 2018?

20:01:03 6 A. **Yes, sir.**

20:01:03 7 Q. And during that time frame were you
 20:01:10 8 testing other samples of talc for asbestos?

20:01:16 9 A. **Yes.**

20:01:16 10 Q. And during that time frame were you
 20:01:18 11 testing other materials, not talc, for asbestos?

20:01:23 12 A. **Yes.**

20:01:23 13 Q. In that time frame were you testing
 20:01:25 14 asbestos?

20:01:27 15 A. **Well, we were doing regular PLM for**
 20:01:32 16 **products for added -- that have asbestos added to it,**
 20:01:36 17 **such as chrysotile, typically see chrysotile most of**
 20:01:39 18 **the time, some amosite.**

20:01:41 19 Q. Okay. Any products that you were testing
 20:01:43 20 that have either tremolite or anthophyllite in them?

20:01:46 21 A. **Other than cosmetic talc, no.**

20:01:49 22 Q. How many TEMs does your lab have?

20:01:51 23 A. **Four.**

20:01:52 24 Q. Do you use all four at the same time?

20:01:57 25 A. **If four analysts are busy, yes.**

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20:01:59 1 Q. Are they all in the same room?
 20:02:01 2 A. No.
 20:02:01 3 Q. Are they each -- do they each have their
 20:02:06 4 own TEM room?
 20:02:07 5 A. Yes.
 20:02:07 6 Q. So in a given TEM room is it just the TEM
 20:02:11 7 there that's for testing?
 20:02:13 8 A. Correct.
 20:02:14 9 Q. There's no PLM or XRD in the TEM room?
 20:02:21 10 A. No.
 20:02:21 11 Q. Do you use the same PLMs for
 20:02:27 12 asbestos-containing material as you use for testing
 20:02:29 13 talc?
 20:02:30 14 A. No. We have a specific PLM scope that has
 20:02:35 15 been modified to enhance sensitivity.
 20:02:39 16 Q. So that PLM is only used for talc?
 20:02:41 17 A. Yes.
 20:02:41 18 Q. Are your talc samples handled in the same
 20:02:46 19 room as asbestos samples?
 20:02:47 20 A. No.
 20:02:47 21 Q. Does MAS have a clean room?
 20:02:49 22 A. We don't have a Class 100 clean room. We
 20:02:54 23 have a specific room set up just for cosmetic talc.
 20:02:58 24 Q. And what steps -- why haven't you
 20:03:03 25 constructed a clean room?

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20:04:18 1 clothing when testing talcum powder samples for
 20:04:21 2 asbestos?
 20:04:21 3 A. No. They use special hoods. There is no
 20:04:28 4 danger of being exposed to asbestos in the talcum
 20:04:33 5 powder when you're pulling out TEM grids. It's
 20:04:37 6 trapped onto the TEM grids.
 20:04:39 7 There's never been, that I've heard of, of
 20:04:41 8 somebody getting exposed there. Everything is done
 20:04:43 9 in safety hoods. So none of our analysts are being
 20:04:46 10 exposed.
 20:04:46 11 Q. What was -- is it Dr. Rigler?
 20:04:50 12 A. Yes, it is.
 20:04:51 13 Q. What is Dr. Rigler's contribution to your
 20:04:55 14 expert report in this case?
 20:04:56 15 A. His contribution was to review it, to
 20:05:00 16 review all the data, to look at the data, make sure
 20:05:04 17 it's matched in the appropriate places. And he did
 20:05:09 18 the QA/QC report, so you can ask him tomorrow why he
 20:05:13 19 didn't put that one chart in. That's primarily it
 20:05:16 20 for this report.
 20:05:17 21 Q. When you say review the data, does that
 20:05:20 22 mean he reviewed it in the same substantive way that
 20:05:24 23 you did to make sure the analysts did their job?
 20:05:26 24 A. No. But he would review it that the data
 20:05:29 25 is there for the appropriate materials. But he

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20:03:06 1 MR. CIRSCH: Object to form.
 20:03:06 2 THE WITNESS: Because there's no need to.
 20:03:08 3 If there's any work that is done on any of these
 20:03:11 4 materials, they're done in a biological hood so
 20:03:17 5 that if there's any escape of material, it can
 20:03:22 6 be filtered. We don't do a clean room.
 20:03:24 7 Q. (By Mr. Chachkes) Okay.
 20:03:24 8 A. It's a clean hood but not a clean room.
 20:03:27 9 Q. Okay. So your aliquot of a particular
 20:03:32 10 bottle for the purpose of doing a TEM test or whether
 20:03:35 11 it's a PLM test, that aliquot's taken out in a hood?
 20:03:38 12 A. Yes. Your experts have been to our lab
 20:03:41 13 and one will be there tomorrow. You can ask him what
 20:03:44 14 they see when they get there to get their aliquots.
 20:03:47 15 Q. Does MAS test -- strike that.
 20:03:49 16 Does the same analysts who test
 20:03:54 17 asbestos-containing material in your lab, do they
 20:03:56 18 also test for -- test talc for asbestos?
 20:03:59 19 A. No. The same analysts for PLM? I mean, I
 20:04:05 20 guess I need clarification of that question.
 20:04:07 21 Q. How about for TEM?
 20:04:08 22 A. TEM, if we have other samples that are
 20:04:11 23 being run, the same analyst will do that sample, too,
 20:04:14 24 in the TEM.
 20:04:15 25 Q. Do your analysts wear any sort of special

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20:05:34 1 doesn't review it like I do.
 20:05:36 2 When I review the data, I review every
 20:05:39 3 sheet, every micrograph, every diffraction pattern so
 20:05:44 4 that I concur with the analysts' findings for the
 20:05:48 5 various tests that we've done.
 20:05:50 6 Q. So is it fair to say that his review is
 20:05:55 7 more sort of, let's say, a typo level and consistency
 20:06:02 8 level as opposed to substantive level?
 20:06:05 9 A. You'll have to ask him how much
 20:06:07 10 substantive level. But he was a TEM microscopist.
 20:06:11 11 He knows what the EDS pattern -- EDXA patterns look
 20:06:17 12 like and what they should be. He looks for the
 20:06:20 13 identification. But his -- but mine's more in depth
 20:06:25 14 on the data than his is.
 20:06:27 15 Q. Okay. Is he qualified to testify about
 20:06:32 16 how EDXA is -- EDSA -- EDXA is run?
 20:06:37 17 A. Sure.
 20:06:37 18 Q. Okay. And he's qualified to testify how
 20:06:40 19 PLM is run?
 20:06:40 20 A. He's not a PLM analyst. I don't know how
 20:06:45 21 much knowledge he has or if he could -- like I could,
 20:06:49 22 take me a while to sit down and actually analyze a
 20:06:53 23 PLM sample.
 20:06:53 24 Q. What about XRD, is he an expert in XRD?
 20:07:06 25 A. I don't believe so.

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20:07:07 1 Q. Okay. What about SAED?

20:07:11 2 A. Could he index a diffraction pattern by hand? You'll have to ask him.

20:07:16 3 Q. Okay. Did he do any sort of substantive review of the SAED patterns?

20:07:23 6 A. He knows the differences between talc patterns and anthophyllite type patterns, but that really was all my responsibility.

20:07:32 9 Q. Okay. Does he have any responsibility for reviewing EDXA readouts?

20:07:40 11 A. He did review them. He knows EDS spectra and the classic ratios of elements, silica to metals, that you would expect for these types of regulated asbestos fibers and bundles.

20:07:58 15 Q. Is he qualified to testify to the same degree and substance as you regarding your January report?

20:08:09 18 A. I don't know. I don't believe -- I don't believe he is as in-depth as I am on this January report with the data. I believe what his responsibility is, he can recognize the appropriate EDS patterns for the appropriate regulated asbestos.

20:08:26 23 He's not a PLM analyst. He has reviewed -- he looks over, makes sure the materials are present, the

20:08:36 25 QA/QC, the chains of custody, that sort of thing.

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20:09:56 1 separation early on, that that was the way to go, the problems associated with it because of the density of anthophyllite without iron versus iron.

20:10:06 4 Chrysotile issue, I'm sure we'll figure out together on how to extract chrysotile using the old Windsor method with citric acid. He's a very bright scientist.

20:10:19 8 Q. You've issued reports on other bottles of J&J talc not in the MDL where he wasn't a coauthor of the report; correct?

20:10:26 11 A. Is that right?

20:10:27 12 Q. I'm asking.

20:10:28 13 A. I think he's been on every report.

20:10:30 14 MR. CHACHKES: Okay.

20:10:33 15 I think I have no further questions, but there are other people, and I'm just going to maintain the objection I stated at the beginning, which is we'll have to review the enormous amount of data that was belatedly produced and determine whether to re-call the witness.

20:10:46 22 MR. PROST: I'm happy to go now. I don't have much.

20:13:19 24 (Off the record.)

20:13:19 25 MR. CHACHKES: Just to amend what I said

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20:08:38 1 Q. Could he substitute for you as an expert in the case presenting this report?

20:08:54 3 MR. CIRSCH: Object to form.

20:08:55 4 THE WITNESS: I don't know.

20:08:57 5 Q. (By Mr. Chachkes) That would be a question for him?

20:08:59 7 A. You know, if I leave here and get hit by a bus, I guess we'll find out.

20:09:02 8 Q. Would that be a question for him?

20:09:07 10 A. Hoping that Dr. Longo get hits by a bus so he can step in and take my place?

20:09:12 12 Q. Let's take the latter first.

20:09:14 13 A. You'll have to ask him.

20:09:15 14 Q. Okay. Why did you involve him?

20:09:21 15 A. Because he's one of our senior scientists, and I involved him very early on. Dr. Rigler and I spent a lot of time collaborating together when we initially took on this project.

20:09:34 19 And the main thing was we didn't feel it was the right thing to do to do the TEM long -- what I call the TEM long method, where to get some reasonable detection limits, you have to look at 500,000 grid openings. That ties up a TEM too long, and I just didn't think it was very efficient.

20:09:54 25 We talked about the heavy liquid density

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20:13:21 1 before, I'm going to reserve time after the other defendant or defendants ask their questions, which will give me time to review my notes to see if I'm actually done.

20:13:35 5 EXAMINATION

6 BY MR. PROST:

7 Q. Hi, Dr. Longo.

8 A. Good evening.

20:13:39 9 Q. With respect to Dr. Rigler, did he subject

20:13:41 10 any substantive changes?

20:13:43 11 A. He might have.

20:13:44 12 Q. You don't recall any as you sit here?

20:13:47 13 A. No. I mean, we all have our own editing

20:13:51 14 style. Sometimes he'd say this doesn't make any

20:13:52 15 sense, which is not uncommon with my struggle with

20:13:56 16 the English language.

20:13:57 17 Q. Okay. You mentioned that you do not store

20:14:01 18 talc and asbestos samples in the same room at MAS?

20:14:04 19 A. Correct.

20:14:04 20 Q. Do you store all of your talc samples in

20:14:08 21 the same room regardless of the manufacturer or

20:14:12 22 supplier?

20:14:13 23 A. They are stored in the same room in

20:14:17 24 separate containers, separate sealed bags, and

20:14:21 25 separate locked cabinets.

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20:14:22 1 Q. Are there other talc samples provided by
20:14:24 2 other manufacturers or suppliers other than Johnson &
20:14:27 3 Johnson?
20:14:27 4 A. Yes.
20:14:28 5 Q. How many others?
20:14:29 6 A. A number.
20:14:32 7 Q. More than five?
20:14:35 8 A. I don't know.
20:14:37 9 Q. And these samples span decades from these
20:14:41 10 other manufacturers as to Johnson & Johnson?
20:14:44 11 A. Typically.
20:14:44 12 Q. With respect to fibrous talc, I think I
20:14:49 13 heard you say this, but fibrous talc is not asbestos;
20:14:52 14 right?
20:14:53 15 MS. O'DELL: Object to form.
20:14:54 16 THE WITNESS: It's not one of the
20:14:55 17 regulated asbestos types.
20:14:56 18 Q. (By Mr. Prost) And so no matter the shape
20:14:57 19 or size or aspect ratio, if it's chemically talc,
20:15:01 20 it's not asbestos?
20:15:02 21 A. It is not one of the regulated asbestos
20:15:07 22 types that we would report as asbestos.
20:15:09 23 Q. You attempted to quantify the fibrous talc
20:15:13 24 in your most recent January 15, 2019, report; is that
20:15:19 25 right?
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20:16:25 1 some we don't, especially by TEM. PLM, it's
20:16:29 2 just about in every sample.
20:16:32 3 With the heavy liquid density separation,
20:16:35 4 you know, theoretically, you should be removing
20:16:37 5 all the fibrous talc along with the platy talc,
20:16:40 6 but there is some fibers in there.
20:16:42 7 A true quantitative analysis where -- is
20:16:45 8 to take any of these samples that have fibrous
20:16:48 9 talc in and do a regular no heavy liquid density
20:16:53 10 separation and see how many orders of magnitude
20:16:56 11 the fibrous talc is compared to what we're
20:16:59 12 seeing in TEM with the heavy density liquid
20:17:02 13 separation.
20:17:02 14 Q. (By Mr. Prost) On page 13 of your
20:17:04 15 January 2019 report, you quantify it as abundant,
20:17:10 16 common, or trace; is that right?
20:17:11 17 A. Yes.
20:17:12 18 Q. And is there any published or
20:17:16 19 peer-reviewed literature that guided those
20:17:19 20 categories, or is that something that you or MAS came
20:17:21 21 up with?
20:17:22 22 A. It was our collective -- what would you
20:17:26 23 say is trace, how do we kind of give some information
20:17:28 24 about it, because that's what we were doing for a
20:17:31 25 while.
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20:15:19 1 A. Yes.
20:15:19 2 Q. And just describe briefly how you did
20:15:21 3 that.
20:15:21 4 A. It's very qualitative. The analyst for
20:15:25 5 each of these samples going all the way back, they
20:15:28 6 make an estimate of the number of particles they're
20:15:33 7 seeing in the grid openings as they go through their
20:15:36 8 100 grid openings.
20:15:37 9 At the end of that analysis, they'll state
20:15:39 10 that I was typically seeing one or two or three, and
20:15:43 11 then they'll record one of the typical asbestos talc
20:15:49 12 fibers, diffraction pattern, EDS.
20:15:52 13 So it's a qualitative estimate.
20:15:54 14 Q. In your March 2018 report, did you attempt
20:15:59 15 to quantify the fibrous talc?
20:16:01 16 A. We collected the data, as I recall, but I
20:16:05 17 didn't go through the exercise of just doing the
20:16:07 18 math.
20:16:08 19 Q. Why did you change your methodology in the
20:16:11 20 quantification of fibrous talc between your
20:16:14 21 March 2018 report and in your most recent report?
20:16:16 22 MR. CIRSCH: Object to form.
20:16:17 23 THE WITNESS: I became curious on how much
20:16:20 24 fibrous talc is in the samples where we're
20:16:22 25 seeing fibrous talc. Some samples we see it,
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20:17:33 1 Now we're just using the trace as it's one
20:17:37 2 to three, on average, per opening. And to do the
20:17:41 3 analysis or do the semiquantitative estimation of the
20:17:45 4 number of fibrous talc structures per gram, we just
20:17:49 5 use one per grid opening.
20:17:51 6 Q. So there is no established standard for
20:17:54 7 those three categories that you relied upon?
20:17:59 8 MS. O'DELL: Object to the form.
20:18:00 9 THE WITNESS: I don't think I've seen a
20:18:02 10 document that says if you see fibrous talc, if
20:18:04 11 you only have one or two particles, that it's
20:18:06 12 trace. And it's not -- it's trace compared to
20:18:08 13 what you're seeing there so that you can give
20:18:10 14 some qualitative estimate.
20:18:14 15 And we were using this before I got the
20:18:17 16 idea of actually doing a qualitative count based
20:18:21 17 on one fibrous talc structure per opening.
20:18:27 18 Q. (By Mr. Prost) Have you done any quality
20:18:29 19 assurance reports for fibrous talc?
20:18:32 20 A. No, sir.
20:18:33 21 Q. And how long have you been analyzing
20:18:43 22 materials for asbestos content? When is the first
20:18:46 23 time you did that? How many years ago?
20:18:48 24 A. The first TEM grids that I ever analyzed
20:18:53 25 are in a -- stuck on a petri dish and I have it on
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20:18:58 1 the wall. I think it was about approximately 1985 or
 20:19:02 2 1986.
 20:19:03 3 Q. Is the first time that you ever documented
 20:19:05 4 fibrous talc 2018?
 20:19:07 5 A. No. I used to do a lot of product ID in
 20:19:17 6 the property damage cases, and one of the
 20:19:20 7 fingerprints for U.S. Gypsum Audicote Acoustical
 20:19:26 8 Plaster was that it had approximately 10 percent
 20:19:29 9 International Talc in it. And International Talc,
 20:19:34 10 obviously, eventually is Vanderbilt Talc when they
 20:19:37 11 bought that. And it was a fibrous talc component, so
 20:19:40 12 we were constantly analyzing for fibrous talc.
 20:19:43 13 Because U.S. Gypsum Audicote was the only
 20:19:47 14 acoustical plaster out there that had a combination
 20:19:49 15 of 10 percent perlite -- excuse me -- 10 percent
 20:19:53 16 chrysotile, 60 percent perlite, approximately
 20:19:57 17 10 percent fibrous talc, and the rest of it was
 20:20:02 18 bentonite clay, Wyoming type, and then a few
 20:20:06 19 percentages, 2 or 3 percent of calcium carbonate.
 20:20:09 20 That fibrous talc was the fingerprint for
 20:20:12 21 that product. So we spent a lot of time in these
 20:20:15 22 types of situations debating fibrous talc.
 20:20:20 23 And I must have done that -- and that was
 20:20:22 24 when I was doing all the TEM analysis on the product
 20:20:25 25 ID. I bet I analyzed hundreds and hundreds and

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20:20:28 1 hundreds of samples specifically, besides looking for
 20:20:31 2 the other primary ingredients, is looking at and
 20:20:34 3 making sure if it was U.S. Gypsum Audicote versus
 20:20:38 4 National Gypsum spray -- God, I've forgotten the
 20:20:44 5 name -- or one of the other without the fibrous talc.
 20:20:47 6 Q. That was all industrial talc?
 20:20:50 7 A. Yes.
 20:20:50 8 Q. So the first time you would have
 20:20:53 9 documented the presence of fibrous talc in cosmetic
 20:20:56 10 talc, would that have been 2018?
 20:20:58 11 A. Whenever we first started doing these
 20:21:00 12 analyses. I think that was November, December,
 20:21:05 13 January, or so, in early 2018.
 20:21:08 14 Q. I know you're not giving any medical
 20:21:11 15 causation opinions with respect to disease or ovarian
 16 cancer, am I also correct you're not going to offer
 20:21:18 17 any opinions as to the root of exposure, whether it
 20:21:19 18 be the female reproductive tract versus inhalation;
 20:21:23 19 is that correct?
 20:21:23 20 A. That is correct. I will not be giving
 20:21:26 21 those types of opinions.
 20:21:27 22 Q. You've never been to a talc mine?
 20:21:30 23 A. I still haven't.
 20:21:30 24 Q. You've not studied the geology of the
 20:21:34 25 mines in Vermont or China, have you?

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20:21:37 1 MR. CIRSCH: Object to form.
 20:21:38 2 THE WITNESS: I am not a geologist. My
 20:21:40 3 role is what's in the bottle.
 20:21:41 4 Q. (By Mr. Prost) Do you agree that the
 20:21:44 5 geologic process that controls the formation of any
 20:21:47 6 given talc deposits are unique?
 20:21:49 7 MS. O'DELL: Object to the form.
 20:21:50 8 THE WITNESS: I'm not a geologist. I
 20:21:52 9 don't know how unique, especially for the
 20:21:56 10 Vermont and Italian mines. We see from those
 20:22:01 11 time periods that they have asbestos.
 20:22:02 12 So I'll let other geologists say how
 20:22:05 13 unique or not unique they are. That's not my
 20:22:07 14 area.
 20:22:07 15 Q. (By Mr. Prost) You would expect the
 20:22:09 16 accessory minerals in any given talc deposit to be
 20:22:12 17 different from one continent to another, wouldn't
 20:22:15 18 you?
 20:22:15 19 MR. CIRSCH: Object to form.
 20:22:16 20 THE WITNESS: I don't have an expectation
 20:22:18 21 one way or the other.
 20:22:18 22 Q. (By Mr. Prost) You can't name for me the
 20:22:21 23 mines in Vermont that would have been sourced for J&J
 20:22:24 24 baby powder, can you?
 20:22:26 25 A. Besides Hammonds, Argonaut, and

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20:22:30 1 what's the other one? I'm missing one.
 20:22:32 2 Q. You're not able to break down the samples
 20:22:36 3 that you've tested in your reports pertaining to any
 20:22:40 4 specific mine in Vermont or a year, are you?
 20:22:42 5 A. Without going through all the documents
 20:22:44 6 showing that when you switched from Hammonds -- or
 20:22:49 7 Argonaut, there's specific years in discovery, but I
 20:22:50 8 haven't bothered doing -- I haven't done that, if
 20:22:54 9 it's important.
 20:22:54 10 Q. All right. Do you know when Imerys began
 20:22:57 11 supplying talc for Johnson & Johnson Baby Powder?
 20:23:00 12 A. It's always unclear to me. Of course,
 20:23:07 13 it's the -- in 1980 we have some -- maybe with the
 20:23:12 14 Vermont and the later '80s.
 20:23:17 15 I haven't memorized -- and because we've
 20:23:21 16 been going so long, I'm tired. I've had that
 20:23:24 17 information at the tip of my tongue before, but I
 20:23:26 18 would have to look it back up what Imerys says in
 20:23:30 19 their sworn interrogatories when they started doing
 20:23:32 20 that, as well as Johnson & Johnson when they say they
 20:23:34 21 started buying it versus when it was their own mine
 20:23:37 22 and that sort of thing.
 20:23:38 23 Q. Are you familiar or knowledgeable
 20:23:40 24 regarding the selective mining processes that Imerys
 20:23:44 25 would have used?
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20:23:45 1 A. Is that like the video where they were
 2 blowing it up?
 3 I'm not here to talk about selective
 4 mining processes or not. My role is just an analysis
 5 of what's in these particular containers.
 6 Q. You're not familiar or knowledgeable
 7 regarding the flotation process that Imerys used over
 8 the years, are you?
 9 A. I've read a lot about it. In fact, we're
 10 going to use one, I believe, with the citric acid to
 11 try to concentrate the chrysotile if present.
 12 So without looking at it and going through
 13 the processes that have been stated in a lot of the
 14 documents I've read, other than that, no.
 15 Q. Are you aware of any published literature
 16 stating that any of the mines used to source
 17 Johnson & Johnson Baby Powder were contaminated with
 18 asbestos or amphibole asbestos?
 19 A. Published literature versus in-house
 20 testing and company's own stuff?
 21 Q. Say peer-reviewed literature.
 22 A. I'm sorry, could you repeat that?
 23 Q. Are you aware of any peer-reviewed
 24 literature stating that any of the mines used to
 25 source Johnson & Johnson's Baby Powder or Shower to
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20:26:06 1 that bottle in 1996?
 2 MR. CIRSCH: Object to form.
 3 THE WITNESS: Well, that would have been
 4 hard to go back in time with it. I think she
 5 also testified that she bought a number of
 6 bottles over the years.
 7 (By Mr. Prost) You would agree she was a
 8 bit confused in her deposition?
 9 MR. CIRSCH: Object to form.
 10 THE WITNESS: No, sir, I don't make that
 11 judgment about anybody.
 12 (By Mr. Prost) I've heard it read and
 13 think you've probably been asked this before, but
 14 would you agree that less than 1 percent of the
 15 amphiboles in the world are asbestiform?
 16 MR. CIRSCH: Object to form.
 17 THE WITNESS: You know, I just don't know
 18 what 1 percent of probably, I don't know, how
 19 many zero tons of amphibole's out there.
 20 Sometimes people seem to suggest that 1 percent
 21 isn't very much. 1 percent of something really
 22 big tends to be a lot.
 23 (By Mr. Prost) You're familiar with
 24 peer-reviewed studies, though, that have said that;
 25 right?
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20:24:59 1 Shower were contaminated with amphibole asbestos or
 2 chrysotile?
 3 MS. O'DELL: Object to the form.
 4 THE WITNESS: I mean, the geological
 5 reports that go back and -- and Alice Blount can
 6 pick on -- Alice Blount didn't say that this
 7 came from Vermont. I assume she knows where, as
 8 a geologist, as a consultant, where that talc
 9 came for that 1989 or that 1990 bottle of
 10 Johnson's Baby Powder that she tested to show
 11 tremolite asbestos.
 12 But an actual peer-reviewed publication
 13 stating that the accessory minerals are asbestos
 14 type or regulated asbestos as counted by these
 15 standard peer-reviewed protocols, I can't think
 16 of any.
 17 Q. (By Mr. Prost) Have you read Alice
 18 Blount's deposition transcript from the Ingham case?
 19 A. I have.
 20 Q. And is it your belief from reading that
 21 testimony that she's saying that sample I from her
 22 1990 report was a bottle of Johnson & Johnson Baby
 23 Powder?
 24 A. She says it is.
 25 Q. Did you read where she said she bought
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20:27:09 1 A. Yes, sir.
 2 Q. And you don't have reason to disagree with
 3 that, do you?
 4 A. No, sir. I'm just curious on if you were
 5 to take every amphibole mineral in the world and then
 6 say only 1 percent of that is asbestos. There
 7 certainly seems to be enough amphibole asbestos in
 8 the world to supply a very large contingent of
 9 products over the years until it got all banned or no
 10 longer made for amphiboles.
 11 So I don't have any -- I can't give you a
 12 relationship what 1 percent means. It's not
 13 1 percent of a pound. It's 1 percent of -- I don't
 14 know how many -- how you would weigh it all.
 15 Q. I know you might think it's still a lot,
 16 but you have no reason to disagree with the
 17 peer-reviewed literature that you've seen that has
 18 said that less than 1 percent of the amphiboles in
 19 the earth's crust is asbestiform?
 20 A. No, sir. I just was curious how much of
 21 the crust is made up of the percentage of what the
 22 weight is.
 23 Q. I think I've seen you testify before --
 24 and I want to see if you still agree -- if an
 25 amphibole is crystallized in a nonasbestiform habit,
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20:28:22 1 no matter how much you can grind it up, it can never
20:28:26 2 turn into asbestos or asbestiform?

20:28:29 3 MR. CIRSCH: Object to form.

20:28:30 4 THE WITNESS: It's unclear to me what an
20:28:33 5 nonasbestiform habit is other than you may have
20:28:36 6 massive, blocky. It's all a geological shape.

20:28:39 7 If you grind up a rock, you do not produce
20:28:44 8 asbestos. If you grind up tremolitic -- massive
20:28:50 9 tremolitic, you typically will get both, but you
20:28:53 10 will not get bundles.

20:28:55 11 What we do is count it as regulated
20:28:58 12 asbestos per the protocols.

20:29:01 13 Q. (By Mr. Prost) Right. So if it
20:29:03 14 crystallizes in a nonasbestiform habit, tremolite,
20:29:06 15 for example, and you grind it up and it falls under
20:29:09 16 the counting rules you use, you call it asbestiform,
20:29:12 17 regardless; right?

20:29:14 18 MR. CIRSCH: Object to form.

20:29:15 19 THE WITNESS: Well, everything we've
20:29:17 20 looked at has crystallized in a fibrous habit.
20:29:20 21 Asbestiform habit and fibrous habit are the same
20:29:23 22 thing because we're looking at fibers.

20:29:25 23 If you look at all the crystalline habits,
20:29:27 24 there's a wide range, and most of them are not
20:29:29 25 fibrous, only one where they would call fibrous.

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20:29:33 1 But you're not going to get an asbestiform
20:29:36 2 bundle from grinding up cleavage fragments.
20:29:40 3 Q. (By Mr. Prost) I'm not talking about what
20:29:42 4 you've seen or looked at or issued in your report;
20:29:44 5 but just hypothetically, if you have nonasbestiform
20:29:47 6 tremolite or amphibole that's crystallized in a
20:29:50 7 nonasbestiform habit, no matter -- if someone were to
20:29:54 8 grind that up so that the shape came out to be, under
20:29:58 9 the counting rules that you go by, you would still
20:30:00 10 call that asbestiform?

20:30:03 11 MR. CIRSCH: Object to form.

20:30:04 12 THE WITNESS: Well, it's a hypothetical I
20:30:05 13 don't believe exists. If you grind up a rock or
20:30:08 14 something that's massive, you get little pieces,
20:30:10 15 irregular shapes. To get a perfectly parallel
20:30:15 16 side I think is rare.

20:30:17 17 And you have to look at what else we're
20:30:20 18 seeing here. Every bundle is asbestiform. And
20:30:25 19 you would think you would have the same type of
20:30:27 20 crystalline habit that is generating both
20:30:31 21 asbestiform as well as some cleavage fragments.
20:30:34 22 We do see cleavage fragments. But it's my
20:30:38 23 belief you get both. It's never one or the
20:30:40 24 other.
20:30:40 25 Q. (By Mr. Prost) If an amphibole is

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20:30:42 1 fibrous, in your opinion, is it necessarily
20:30:44 2 asbestiform?

20:30:47 3 A. In my opinion, if it is fibrous, it is
20:30:49 4 asbestiform because it has a form like asbestos.

20:30:52 5 Q. Are you aware of any peer-reviewed studies
20:30:55 6 to support that?

20:30:59 7 A. Other than --

20:31:00 8 Q. I'm sorry, that if an amphibole is
20:31:02 9 fibrous, it necessarily has to be asbestiform?

20:31:06 10 A. You know, other than the geological
20:31:09 11 definition for a crystalline habit and that it is
20:31:12 12 fibrous and, you know, whatever the population is,
20:31:16 13 population is more than one.

20:31:18 14 But we're getting enough data now that
20:31:20 15 these populations -- and you just can't -- you know,
20:31:25 16 no longer look at from a sample from the same mine
20:31:30 17 that it's a unique thing.

20:31:31 18 All the samples from the mine that we're
20:31:33 19 seeing over and over again show asbestiform minerals
20:31:37 20 in it, specifically tremolite series and the
20:31:39 21 anthophyllite series.

20:31:42 22 It's just my opinion. I mean, others may
20:31:44 23 disagree, but that's my opinion.

20:31:45 24 Q. Is there a specific article or
20:31:48 25 peer-reviewed literature or study that says if you

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20:31:50 1 have an amphibole and it's in a fibrous form, that it
20:31:53 2 is necessarily asbestos or asbestiform?

20:31:57 3 MR. CIRSCH: Object to form.

20:31:58 4 THE WITNESS: Every protocol that we're
20:31:59 5 using here has a definition of what you call a
20:32:01 6 regulated asbestos. Everything that I have
20:32:04 7 reported has followed the peer-reviewed
20:32:06 8 protocols and methods to say it is a regulated
20:32:09 9 asbestos that is fibrous to whatever degree they
20:32:12 10 use for their counting rules. In my opinion,
20:32:14 11 that makes it all asbestiform.

20:32:15 12 Q. (By Mr. Prost) So the counting rules and
20:32:16 13 the protocols that you used for your reports are what
20:32:22 14 you're talking about?

20:32:22 15 A. Yes, sir.

20:32:23 16 Q. No other articles or papers that you can
20:32:26 17 think of?

20:32:26 18 A. Not as I sit here this second, no.

20:32:28 19 Q. Are you aware of any peer-reviewed
20:32:30 20 articles or literature that say the opposite, that
20:32:32 21 you can have fibrous amphiboles that are not
20:32:35 22 asbestiform?

20:32:37 23 A. There's a couple.

20:32:39 24 MS. O'DELL: Object.

20:32:40 25 Q. (By Mr. Prost) And who would those be

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20:32:41 1 from?
 20:32:41 2 A. Oh, I think Ann Wylie has published one or
 20:32:44 3 two. Just depends on who the authors are.
 20:32:48 4 Q. And you just disagree with that?
 20:32:50 5 A. Well, I don't agree with their opinions
 20:32:52 6 that if it is a bundle. But I disagree that if you
 20:32:56 7 take an individual fiber that you can't tell one way
 20:32:59 8 or the other because it has the same chemistry, it
 20:33:03 9 has the same crystalline pattern, it has the same
 20:33:07 10 surface charge, and it's called a regulated asbestos
 20:33:10 11 fiber, if it meets all that counting criteria. In my
 20:33:15 12 opinion, if it is fibrous and it is asbestos, it is
 20:33:19 13 asbestosiform.

20:33:20 14 Q. I know you think that or you testified
 20:33:23 15 that high tensile strength and flexibility don't mean
 20:33:26 16 much because they can't be measured, I think; is that
 20:33:29 17 a fair way of describing what you've said or what
 20:33:32 18 your opinion is?

20:33:33 19 A. Well, it's not defined. And both the
 20:33:36 20 polarized light microscope as well as the
 20:33:39 21 transmission electron microscope do not have any
 20:33:43 22 ability to make those measurements. It's just a
 20:33:45 23 general description.

20:33:47 24 Q. Wouldn't you agree that there's ways to
 20:33:50 25 observe whether something has high tensile strength

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20:35:08 1 tensile strength and flexibility?
 20:35:09 2 MR. CIRSCH: Object to form.
 20:35:10 3 THE WITNESS: No. You know, if you're
 20:35:13 4 going to look at the published literature for
 20:35:14 5 high tensile strength for chrysotile, amosite,
 20:35:18 6 and crocidolite, you're running around 90,000 to
 20:35:21 7 120,000 psi.

20:35:22 8 If you look at what the characteristics or
 20:35:25 9 tensile strength is for tremolite anthophyllite,
 20:35:27 10 it's about 4,000 psi, and it's brittle. And
 20:35:31 11 you're milling it.

20:35:32 12 So if you can see the bundles at times
 20:35:35 13 that we get, you can see where it has been
 20:35:38 14 milled and broken in half. There's nothing
 20:35:41 15 there to do that.

20:35:42 16 When we identify regulated asbestos in the
 20:35:45 17 PLM method, it meets the criteria for what they
 20:35:49 18 say is regulated. It has -- those individual
 20:35:52 19 fibers and those bundles are all greater,
 20:35:55 20 typically, on average, greater than 20-to-1.

20:35:58 21 They can be broken down to smaller fibers
 20:36:00 22 and bundles. It's greater than -- the width of
 20:36:04 23 the structure is greater than 5 micrometers. It
 20:36:07 24 meets the criteria for the ISO 22262-2.

20:36:11 25 Nowhere in any of that method does it tell
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20:33:53 1 and flexibility?
 20:33:54 2 A. Sure. If you go to the mine and get a --
 20:33:57 3 I think a 10 centimeter sample is the minimum, and
 20:34:00 4 tape it to paper and go put it on an Instron, which
 20:34:03 5 is a device that will measure tensile strength, I
 20:34:07 6 wouldn't want to be standing around when you do it.
 20:34:10 7 Because when they pop, they'll spread fibers
 20:34:14 8 everywhere because you're just dealing with large
 20:34:17 9 bundles.

20:34:17 10 With a transmission electron microscope,
 20:34:19 11 with a polarized light microscope, or even XRD, it's
 20:34:22 12 impossible. There is no ability to make that
 20:34:25 13 measurement. And standard protocols for making
 20:34:29 14 determinations or measurements lay out how you do
 20:34:31 15 that. They don't even define what high tensile
 20:34:35 16 strength is.

20:34:36 17 Q. Under PLM, is it your opinion that --
 20:34:40 18 sounds like it is your opinion -- it is impossible to
 20:34:43 19 make a determination whether a population of fibers
 20:34:48 20 or a bundle has high tensile strength or flexibility?

20:34:52 21 A. It is impossible. And they don't provide
 20:34:56 22 you any method for doing that.

20:34:57 23 Q. In terms of curvature, splayed ends,
 20:35:03 24 parallel sides, that sort of thing, you don't think
 20:35:04 25 that gives any guidance on the observance of high

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20:36:14 1 you, oh, you better measure the tensile
 20:36:17 2 strength.

20:36:17 3 Q. (By Mr. Prost) The 34 or 35 samples from
 20:36:21 4 your March 2018 report, you're still relying upon the
 20:36:25 5 results of that report here in the MDL; is that
 20:36:29 6 right?

20:36:29 7 A. No, I'm not. I'm relying on the MDL
 20:36:32 8 report. The only thing that the MDL does is verify
 20:36:36 9 our earlier findings, but I'm not relying on it here.

20:36:38 10 Q. Well, your MDL report includes the
 20:36:40 11 findings of positive of what you're calling asbestos,
 20:36:44 12 though, in those -- in terms of your computations of
 20:36:47 13 the percentages?

20:36:47 14 A. I'm sorry, could you repeat that?

20:36:49 15 Q. Sorry, it was -- yeah, clumsy.

20:36:51 16 In your January 2019 MDL report, you're
 20:36:54 17 including the findings of those original Johnson &
 20:36:58 18 Johnson samples, those 35 in your overall
 20:37:01 19 percentages, aren't you?

20:37:02 20 A. No. The only thing that's in there that
 20:37:04 21 came from the original report is that MDL sample, the
 20:37:10 22 1978 MDL sample. That's the only sample.

20:37:15 23 Q. You changed your methodology from the
 20:37:19 24 March 2018 report until now. Why did you do that?
 20:37:22 25 MR. CIRSCH: Object to form.

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20:37:23 1 THE WITNESS: Because we -- we didn't
 2 really change it. We just started using the
 3 definitions and the ability for the ISO 22262-2
 4 because it's an International Standard that has
 5 been peer-reviewed by all the international
 6 scientists that are on it or in the committees,
 7 and it provides a standard method other than
 8 just the Blount heavy density liquid separation
 9 and TEM.

20:37:51 10 Q. (By Mr. Prost) Is the method you're doing
 20:37:53 11 now more reliable than what you did last year?

20:37:55 12 A. No.

20:37:56 13 MR. CIRSCH: Object to form.

20:37:56 14 THE WITNESS: They are both reliable.

20:37:59 15 Q. (By Mr. Prost) Is your concentration
 20:38:02 16 preparation any different now than what you did in
 20:38:07 17 early 2018, that first report?

20:38:10 18 A. No. We are using the exact same method,
 20:38:16 19 except the ISO 22262-2 says use heavy density liquid
 20:38:22 20 of 2.85, if I remember, and Blount had said 2.81.
 20:38:30 21 So now I have a method that specifically
 20:38:32 22 uses 2.85 that we have been using under Blount.

20:38:37 23 Q. For the Johnson & Johnson MDL samples, I
 20:38:43 24 think you testified that some of those containers had
 20:38:48 25 been previously opened?

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20:38:51 1 MS. O'DELL: Object to the form.
 20:38:53 2 THE WITNESS: Well, they got previously
 20:38:55 3 opened when they were split. I don't have any
 20:38:59 4 history on what Johnson & Johnson did with
 20:39:03 5 those, but certainly when they got split up in
 20:39:06 6 New Jersey for samples, they were opened in some
 20:39:10 7 manner.

20:39:10 8 Q. (By Mr. Prost) The Imerys samples, the
 20:39:12 9 railcar samples, I haven't seen any photographs of
 20:39:16 10 those, and I think when we talked last time you said
 20:39:19 11 you could produce those?

20:39:20 12 A. Oh, I forgot. Yes.

20:39:21 13 Q. You do have photos of those somewhere that
 20:39:23 14 you can produce them?

20:39:23 15 A. Yes. It should -- I'll endeavor to get
 20:39:27 16 those.

20:39:27 17 Q. All right. I guess we'll ask that those
 20:39:30 18 be produced.

20:39:30 19 You're not familiar with how Imerys stored
 20:39:35 20 those samples before they were produced; right?

20:39:38 21 A. No.

20:39:38 22 Q. Or what specific mines they came out of?

20:39:42 23 MS. O'DELL: Object to the form.

20:39:43 24 THE WITNESS: Well, I guess it would be
 20:39:45 25 easy to track down if there is information and

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20:39:49 1 testimony about when different mines were
 20:39:52 2 started and stopped.

20:39:53 3 Q. (By Mr. Prost) Your opinion on fibers per
 20:40:09 4 gram and your extrapolation from what you found in
 20:40:12 5 the samples, am I correct that you are assuming that
 20:40:17 6 the asbestos contamination is consistent throughout
 20:40:21 7 the entire sample?

20:40:23 8 A. The accessory mineral -- the findings of
 20:40:25 9 the asbestos accessory minerals is consistent
 20:40:30 10 throughout. That's not me assuming it. That's the
 20:40:33 11 protocol. Because all TEM analysis, air samples,
 20:40:37 12 water samples, when you filter it or pull through a
 20:40:40 13 filter, you make that assumption.

20:40:41 14 Q. Your calculations assume that the fibers
 20:40:44 15 are present at the same levels and evenly distributed
 20:40:48 16 throughout every milligram of the sample; is that
 20:40:53 17 right?

20:40:53 18 MR. CIRSCH: Object to form.

20:40:54 19 THE WITNESS: That there will be -- this
 20:40:55 20 is what the range is that we should find, as we
 20:41:00 21 talked about ad nauseam -- I'm sorry -- we
 20:41:04 22 talked about earlier.

20:41:05 23 If we found one and analyzed it again and
 20:41:07 24 found zero, that would not be surprising because
 20:41:10 25 we're right at the detection limit. But if we

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20:41:12 1 found a significant number, 10, 15, 25, I would
 20:41:17 2 expect that we would find positive samples in
 20:41:19 3 each and every -- if we were to do that and do
 20:41:22 4 that for some time, that there is enough in
 20:41:26 5 there that would make that where we would find
 20:41:28 6 similar concentrations.

20:41:29 7 Q. (By Mr. Prost) So at the detection limit
 20:41:34 8 level where you're only finding a couple of fibers,
 20:41:38 9 you wouldn't be surprised to examine the same sample
 20:41:42 10 and not have a nondetect; is that right?

20:41:44 11 A. That wouldn't surprise me, and it wouldn't
 20:41:46 12 surprise me if we had found two fibers the first time
 20:41:49 13 or two asbestos -- regulated asbestos structures the
 20:41:52 14 first time and next time you find four. So you will
 20:41:54 15 have a range at those lower detection limits.

20:41:58 16 Q. Have you ever done a study to verify the
 20:42:02 17 consistency of distribution throughout an entire
 20:42:06 18 sample?

20:42:06 19 A. No. On the distribution and consistency
 20:42:10 20 we haven't done any additional analysis that anybody
 20:42:13 21 else has ever done in the past for analyzing these
 20:42:17 22 same type of samples other than we're using a more
 20:42:21 23 sensitive method.

20:42:21 24 Q. You were shown an EDS -- EDXA spectra. I
 20:42:25 25 think it was Exhibit 12 maybe, if you could pull that

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20:42:30 1 up.
 20:42:41 2 MR. CIRSCH: You can use this one for now.
 20:42:43 3 THE WITNESS: Oh, thank you.
 20:42:44 4 Q. (By Mr. Prost) You were asked some
 20:42:45 5 questions about how at the bottom there's references
 20:42:47 6 to the different -- what do you call it -- not
 20:42:51 7 minerals -- the components. You see what I'm talking
 20:42:55 8 about at the very bottom?

20:42:59 9 A. **In the bottom left-hand corner?**

20:43:01 10 Q. Correct.

20:43:02 11 A. **Yes.**

20:43:02 12 Q. Thanks.

20:43:03 13 And you said, I think, that you weren't
 20:43:05 14 sure if the software automatically pulled up those
 20:43:07 15 calculations or the ratios, the different numbers; is
 20:43:10 16 that right?

20:43:12 17 A. **That's correct.**

20:43:13 18 Q. All right.

20:43:14 19 A. **It's not so much the ratios; it's that you
 20:43:17 20 can do it by elemental percentage or the oxides.**

20:43:20 21 Q. If the software automatically pulled that
 20:43:23 22 up, your analyst wouldn't delete it before they
 20:43:25 23 printed that, would they?

24 MR. CIRSCH: Object to form.

20:43:28 25 THE WITNESS: No. If it is on there for
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20:44:23 1 question.
 20:44:23 2 Are you aware of any other information
 20:44:25 3 that is available on the software that is not on
 20:44:29 4 there or that there's a switch that has turned it
 20:44:32 5 off?
 20:44:32 6 **A. Again, as I discussed earlier some many
 20:44:35 7 hours ago, that I would have to check, if my client
 20:44:40 8 asks. And if my client asks for me to check, I'll
 20:44:42 9 certainly take it under serious consideration.**

20:44:45 10 MR. PROST: That's all I have for now.

20:44:46 11 THE WITNESS: Thank you.

20:44:47 12 MR. PROST: Alex, do you have some more
 20:44:49 13 questions?

20:44:49 14 MR. CHACHKES: No.

20:45:00 15 (Recess from 8:45 p.m. to 8:55 p.m.)

20:56:20 16 EXAMINATION

20:56:25 17 BY MS. O'DELL:

20:56:25 18 Q. Dr. Longo, it's been a very long day,

20:58:09 19 but --

20:58:10 20 A. **Yes, ma'am, it has.**

20:58:11 21 Q. It has, I know, for you. I have a few
 20:58:14 22 questions for you.

20:58:16 23 First, before we begin, would you please
 20:58:19 24 describe your educational background, your background
 20:58:24 25 and expertise.

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20:43:30 1 that particular software, it would be a toggle
 20:43:33 2 switch they would either turn on or turn off.
 20:43:35 3 What's more important is we're following
 20:43:36 4 the ISO method for quantitative EDS where we
 20:43:41 5 have collected the appropriate count times.
 20:43:44 6 Q. (By Mr. Prost) So the analyst could flip
 20:43:46 7 a switch, and it could produce those specific
 20:43:49 8 calculations for us?

20:43:51 9 A. **I don't know that.**

20:43:52 10 MR. CIRSCH: Object.

20:43:53 11 THE WITNESS: It was talked about at
 20:43:55 12 length earlier. It's not something we routinely
 20:43:57 13 do or I'm relying on.

20:44:03 14 Q. (By Mr. Prost) Is there anything else
 20:44:04 15 that you can think of where there's a switch that you
 20:44:08 16 could turn off information that the software was to
 20:44:10 17 automatically put on there?

20:44:12 18 MS. O'DELL: Object to form.

20:44:13 19 MR. CIRSCH: Objection.

20:44:13 20 THE WITNESS: I never stated that the
 20:44:16 21 software automatically wants to do it and the
 20:44:18 22 analysts are fighting with the software where
 20:44:21 23 the software is saying, no, no, I need to do
 20:44:22 24 this.
 20:44:22 25 Q. (By Mr. Prost) I'll rephrase the

20:58:26 1 A. **Yes. My educational background is that I**

20:58:31 2 **graduated from the University of Florida with a
 20:58:32 3 bachelor's of science in microbiology. Went on to
 20:58:35 4 graduate school in the materials science department
 20:58:38 5 and graduated in 1983 with a Ph.D. in materials
 20:58:41 6 science and engineering.**

20:58:42 7 **I started a small company, and we were one**

20:58:45 8 **of the first TEM labs in the country that specialized**

20:58:48 9 **in the analysis of asbestos by transmission electron**

20:58:53 10 **microscopy. Went on to in 1988 open the doors of**

20:58:57 11 **Materials Analytical Services and have been there
 20:59:00 12 ever since as president.**

20:59:01 13 **While I was at the University of Florida,**

20:59:03 14 **I stayed on while I started that first little company**

20:59:06 15 **and eventually became visiting assistant professor at
 20:59:10 16 the University of Florida, which I gave up that**

20:59:12 17 **position in approximately 1986 or so.**

20:59:17 18 **Materials Analytical Services grew at some**

20:59:20 19 **point to almost 80 employees, where we specialized in
 20:59:24 20 everything from analysis of asbestos to materials to**

20:59:29 21 **semiconductors, even doing work for the Department of
 20:59:33 22 Defense on various types of contracts.**

20:59:37 23 **Since that time, we've probably analyzed**

20:59:41 24 **somewhere in the order of 300,000 or 400,000**

20:59:44 25 **individual asbestos samples. We worked with various**

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20:59:49 1 states and agencies in litigation for property damage
 20:59:52 2 and developed techniques for reverse engineering
 20:59:56 3 asbestos-containing products so you could identify
 20:59:57 4 the manufacturer.
 20:59:59 5 And I was the expert for the City of
 21:00:02 6 New York, the State of New York, the State of Hawaii,
 21:00:08 7 the State of Utah, the City of Chicago, plus the
 21:00:13 8 entire school system and public buildings in the
 21:00:18 9 State of Texas.

21:00:20 10 We were the referee lab for the
 21:00:23 11 bankruptcies that involved both U.S. Gypsum,
 21:00:25 12 W.R. Grace, U.S. Mineral as well -- additionally,
 21:00:29 13 Turner & Newall's Limpet, as the referee lab where if
 21:00:33 14 somebody had made a claim, it was up to us to
 21:00:36 15 validate that the particular sample coming out of a
 21:00:39 16 particular building was, in fact, that manufacturer's
 21:00:44 17 product.

21:00:44 18 I have published in the peer-reviewed
 21:00:47 19 literature on the types of testing that we've done
 21:00:50 20 for both asbestos and nonasbestos type products.

21:00:55 21 I have taught at the American Industrial
 21:01:01 22 Hygiene Association for teaching other industrial
 21:01:04 23 hygienists the utility of transmission electron
 21:01:06 24 microscopy specifically for asbestos as well as other
 21:01:09 25 industrial hygiene applications for particle size

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21:02:56 1 won't do it again.
 21:02:57 2 And I'm a member of various organizations.
 21:03:03 3 The American Industrial Hygiene Association, the
 21:03:13 4 microscopy -- materials science microscopy, as well
 21:03:16 5 as I'm a board certified forensic engineer, which is
 21:03:19 6 not just pay your money; you actually have to qualify
 21:03:22 7 from your experience and renew that. I finally
 21:03:26 8 became a fellow in forensic engineering for what I
 21:03:30 9 do.

21:03:31 10 I guess that's it.

21:03:32 11 Q. Have you been qualified as an expert in
 21:03:37 12 asbestos testing and allowed to testify in federal
 21:03:42 13 court?

21:03:42 14 A. Yes. I've been in federal court many
 21:03:46 15 times on our asbestos type work, and in fact I've had
 21:03:49 16 a handful of appellate opinions that the methodology
 21:03:53 17 we use is sound science. I've been qualified as both
 21:03:57 18 a materials scientist in the areas of microscopy, in
 21:04:02 19 the areas of asbestos analysis, in the areas of
 21:04:06 20 industrial hygiene specifically to do with asbestos.

21:04:09 21 And I'm still not a certified industrial hygienist.

21:04:12 22 Q. What were you asked to do in this case?

21:04:15 23 A. I was asked to determine, using standard
 21:04:18 24 protocols, peer-reviewed protocols that are normally
 21:04:22 25 used for the determination of asbestos in materials,

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21:01:13 1 analysis, fugitive type particulates for air quality.
 21:01:20 2 Our laboratory is one of the few in the
 21:01:23 3 country that does VOC testing for all the green
 21:01:27 4 labeling. We're certified to do that by the ISO
 21:01:30 5 certification.

21:01:31 6 Our laboratory also has an FDA laboratory
 21:01:34 7 number so that we do do pharmaceutical or UPS type
 21:01:40 8 testing to verify, typically, different chemicals and
 21:01:47 9 materials that may be emitted or inhaled or injected
 21:01:52 10 or taken by mouth.

21:01:54 11 I've been doing this for almost 30 years,
 21:01:57 12 and my specialty has been and my research over the
 21:02:01 13 years has been asbestos-containing products and the
 21:02:05 14 propensity or not to cause significant exposure
 21:02:08 15 during the use of those products.

21:02:11 16 I was the primary author of the ASTM
 21:02:15 17 Method for the Analysis of Asbestos Fibers and
 21:02:18 18 Bundles in Settled Dust, the D2205 committee for ASTM
 21:02:26 19 standard method, which is probably the most rigorous
 21:02:30 20 peer-reviewed methodology outside of ISO.

21:02:33 21 To get your committee -- your
 21:02:38 22 subcommittee, your committee, and eventually all
 21:02:42 23 40,000 members have the ability for the final time
 21:02:47 24 when it becomes a standard to vote negative on it.
 21:02:52 25 One negative vote sends it back. I did that once. I

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21:04:27 1 air, bulk samples, water samples, what have you, if
 21:04:31 2 there was in fact regulated asbestos in these
 21:04:35 3 containers of Johnson & Johnson Baby Powder, Shower
 21:04:43 4 to Shower during the time that Johnson & Johnson was
 21:04:47 5 manufacturing that before they sold it to Valeant,
 21:04:51 6 Valeant Pharmaceuticals.

21:04:53 7 And using standard methodology to
 21:04:56 8 determine if there was detectable amounts of
 21:04:58 9 regulated asbestos in these containers, historical
 21:05:02 10 containers as well as more contemporary containers.
 21:05:06 11 For this particular case for the MDL we have not
 21:05:13 12 gotten to the MDL China mines but to verify if it
 21:05:18 13 was, in fact, present or not.

21:05:20 14 Q. Okay. Is the methodology that you used in
 21:05:25 15 your work in this case supported by the peer-reviewed
 21:05:32 16 literature?

21:05:32 17 A. Yes. We're using standard protocols that
 21:05:34 18 other scientists in the field of asbestos testing
 21:05:36 19 have used in the years.

21:05:38 20 If there's a publication involving
 21:05:40 21 asbestos analysis of some sort or asbestos in some
 21:05:44 22 product or asbestos release, the protocols that we
 21:05:49 23 use are typically referenced in those peer-reviewed
 21:05:51 24 publications as well as these are standards, standard
 21:05:55 25 testing protocols that are accepted across the

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21:05:59 1 **country for these types of analysis and across the**
 21:06:02 2 **world, especially the International Standards**
 21:06:05 3 **organization protocols that we use.**

21:06:07 4 Q. And is that because of the methodology
 21:06:08 5 that you use and because of the fact that it's
 21:06:12 6 generally accepted in the scientific community, is
 21:06:14 7 the process that you undertook here something that
 21:06:18 8 could be replicated by another scientist or lab?

9 MR. PROST: Objection --

21:06:24 10 MR. SILVER: Objection to form.

21:06:24 11 MR. CHACHKES: Objection. Leading.

21:06:26 12 MS. WOODS: Join.

21:06:26 13 THE WITNESS: Absolutely. They just would
 21:06:28 14 follow the methodology that we have laid out in
 21:06:29 15 the reference protocols, and as long as they are
 21:06:32 16 qualified that they can do this type of
 21:06:34 17 analysis, they should all be able to be
 21:06:37 18 replicated.

21:06:39 19 Q. (By Ms. O'Dell) Let's talk about your
 21:06:40 20 results just very briefly.

21:06:45 21 What were your find -- let me back up and
 21:06:48 22 ask this question.

21:06:49 23 What time period did the samples you
 21:06:51 24 tested for your January 2019 report, what time period
 21:06:56 25 does that cover?

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21:06:58 1 A. **The 1960s, the 1970s, the 1980s, the**
 21:07:03 2 **1990s, and the early 2000s.**
 21:07:05 3 Q. What were the sources from which talc was
 21:07:08 4 mined?
 21:07:10 5 A. **The '60s up until about '67 or so would be**
 21:07:13 6 **from Italy; from there to approximately 2002, 2003,**
 21:07:21 7 **it would be from Vermont; and after that it's from**
 21:07:24 8 **China.**

21:07:25 9 Q. What were your findings regarding
 21:07:27 10 regulated asbestos fibers?

21:07:29 11 A. **Our results overall for 72 what I'll call**
 21:07:35 12 **historical containers that include 15 historical**
 21:07:38 13 **railroad car samples from Imerys, and out of that 72**
 21:07:44 14 **samples, 50 were positive for regulated asbestos, and**
 21:07:48 15 **that gives you a percentage of approximately**
 21:07:50 16 **66 percent or so.**

21:07:52 17 If we break it down -- and, oh, that
 21:07:54 18 includes seven MDL samples that came from the Korean
 21:08:00 19 mine, or what we call the Asian talc.

21:08:04 20 If we break it down for the Johnson's Baby
 21:08:08 21 Powder, we analyzed 34 historical samples with Asian.
 21:08:13 22 Out of that 34, 24 were positive, or 71 percent.

21:08:18 23 We also analyzed 23 historical Shower to
 21:08:21 24 Shower containers that were Johnson & Johnson, and 18
 21:08:25 25 were positive, or 78 percent.

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21:08:28 1 **Of the 15 Imerys railroad car samples,**
 21:08:31 2 **eight were positive, or 53 percent.**
 21:08:36 3 **Excluding the seven Asian Johnson Baby**
 21:08:40 4 **Powder containers would give us 65 Johnson Baby**
 21:08:43 5 **Powder and STS and Imerys railroad car samples**
 21:08:47 6 **analyzed; 44 were positive, or 68 percent, for**
 21:08:49 7 **amphibole asbestos.**

21:08:51 8 **And then we have a break -- then, of**
 21:08:53 9 **course, we have the breakdown of each of these**
 21:08:57 10 **without the Asian.**

21:08:58 11 Q. What were the results for fibrous talc?

21:09:04 12 A. **The qualitative analysis of fibrous**
 21:09:10 13 **talc -- let me just jump to the results section.**

21:09:16 14 Q. Page 9.

21:09:18 15 A. **Thank you. Been a long day.**

21:09:21 16 Q. Sure.

21:09:22 17 A. **Using the ISO PLM method, found that of**
 21:09:32 18 **the 56 Italian/Vermont/China source containers that**
 21:09:36 19 **we analyzed, 55, or 98 percent, contained fibrous**
 21:09:41 20 **talc. The Blount PLM method showed of the 72, 20**
 21:09:45 21 **contained fibrous talc.**

21:09:47 22 **The TEM analysis showed that -- and I have**
 21:09:54 23 **that somewhere -- that there was similar**
 21:09:56 24 **concentration by the heavy density liquid method by**
 21:10:01 25 **TEM, which is biased against finding fibrous talc,**

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21:10:06 1 **because unless it has iron in it, you'll have the**
 21:10:09 2 **same density as platy talc.**
 21:10:12 3 **So, really, the best predictor of fibrous**
 21:10:16 4 **talc would be the ISO PLM that does not use heavy**
 21:10:20 5 **density liquid, and most all the samples except for**
 21:10:23 6 **one that we tested had it in there.**

21:10:42 7 MS. O'DELL: Nothing further, Doctor.
 21:10:43 8 Thank you.

21:10:45 9 THE WITNESS: Thank you.
 21:10:47 10 MR. CHACHKES: Nothing more here.

21:10:50 11 FURTHER EXAMINATION
 12 BY MR. PROST:

21:10:52 13 Q. Just one follow-up.
 21:10:53 14 You're talking about the results,
 21:10:54 15 Dr. Longo. Turn to page 6 of your report.
 21:10:58 16 You talk about how the analysis of 34
 21:11:01 17 historical Johnson's Baby Powder containers you
 21:11:06 18 determined were 71 percent positive.
 21:11:09 19 And then number 2, you say the analysis of

21:11:11 20 22 historical Shower to Shower, or 77 percent,
 21:11:16 21 positive; but the analysis of the Imerys 15 railroad
 21:11:19 22 car samples were only 53 percent positive.

21:11:23 23 Do you have an explanation for the
 21:11:26 24 25 percent difference there between the Imerys
 21:11:31 25 railroad car samples and the finished product

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21:11:34 1 samples?
 21:11:34 2 A. Yes, sir.
 21:11:36 3 Q. What is that?
 21:11:36 4 A. Only eight were positive out of the 15.
 21:11:40 5 Q. Do you have an explanation for why there
 21:11:43 6 would be such a discrepancy in the positive findings
 21:11:46 7 using your methodology?

21:11:47 8 MS. O'DELL: Object to the form.
 21:11:48 9 THE WITNESS: I don't look at it as a
 21:11:49 10 discrepancy. We call them like we see it. So
 21:11:52 11 if it's only eight out of the 15, that's all we
 21:11:55 12 saw.
 21:11:57 13 Q. (By Mr. Prost) And you expect that if the
 21:11:58 14 raw talc supplied had a certain percentage of
 21:12:02 15 asbestos, you would see the same percentage in the
 21:12:04 16 finished product?

21:12:05 17 MS. O'DELL: Object to form.
 21:12:07 18 THE WITNESS: No, I wouldn't expect to see
 21:12:09 19 the same percentage, usually, because you're --
 21:12:11 20 flotation, you're using various methods. And we
 21:12:16 21 don't have a lot of data from the 1990s. So
 21:12:23 22 there may be, you know, a difference in the two.
 21:12:26 23 But we don't have enough data to make that yet,
 21:12:29 24 to make that jump on why one versus the other.

21:12:33 25 Q. (By Mr. Prost) So your opinion as to what
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21:13:27 1 EXAMINATION
 21:13:27 2 BY MR. SILVER:
 21:13:27 3 Q. Dr. Longo, in your report you characterize
 21:13:29 4 the Imerys samples as railcar samples. Where did you
 21:13:32 5 get that description from?
 21:13:33 6 A. It was on the -- I believe it was right on
 21:13:36 7 the containers as well as from the MDL for the chain
 21:13:40 8 of custodies that they sent.
 21:13:42 9 Q. And sitting here today, you believe that
 21:13:43 10 all those samples were actually railcar samples?
 21:13:47 11 MS. O'DELL: Object to the form.
 21:13:48 12 THE WITNESS: I don't know if they all
 21:13:49 13 were. We'd have to look at the chain of
 21:13:51 14 custodies. But I think there were one or two
 21:13:53 15 that said something different than railroad car
 21:13:57 16 samples, but I just characterized them all as
 21:14:00 17 railroad car samples.
 21:14:01 18 MR. SILVER: Thank you. No further
 21:14:03 19 questions.
 21:14:09 20 (Deposition concluded at 9:14 p.m.)
 21:14:09 21 (Pursuant to Rule 30(e) of the Federal
 22 Rules of Civil Procedure and/or O.C.G.A. 9-11-30(e),
 23 signature of the witness has been waived.)
 24 (Original transcript sent to Mr. Frost.)
 25

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21:12:35 1 could explain the difference is that there's a
 21:12:38 2 flotation method and it's a small sample size?
 21:12:41 3 A. No. I never said that. I said there is a
 21:12:44 4 processing on it, but we don't have a lot of samples
 21:12:46 5 from 1990 and 2000. And, you know, we'll just have
 21:12:51 6 to see as we go forward with additional testing.

21:12:55 7 Q. So the smaller the sample size, the less
 21:12:57 8 reliable the findings, you would agree?

21:13:00 9 A. No --
 21:13:00 10 MS. O'DELL: Object to form.
 21:13:00 11 THE WITNESS: I don't agree that the
 21:13:02 12 findings are not reliable at all. They are
 21:13:03 13 reliable. Why there's 53 percent versus some of
 21:13:06 14 the others, you know, hopefully we can answer
 21:13:10 15 this question some day. Or we get a larger
 21:13:17 16 sample size and see if there is actually a
 21:13:17 17 difference.

21:13:17 18 MR. PROST: No further questions.
 21:13:22 19 MR. SILVER: Hold on. Yes, we do. We
 21:13:23 20 have one more. We can feed it to him or just
 21:13:27 21 ask him.
 22 THE WITNESS: Why don't you just go ahead
 21:13:27 23 and ask me.

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1 C E R T I F I C A T E
 2
 3 STATE OF GEORGIA:
 4 COUNTY OF HALL:
 5
 6 I hereby certify that the foregoing
 7 transcript was taken down, as stated in the
 8 caption, and the questions and answers thereto
 9 were reduced to typewriting under my direction;
 10 that the foregoing pages 1 through 359 represent
 11 a true, complete, and correct transcript of the
 12 evidence given upon said hearing, and I further
 13 certify that I am not of kin or counsel to the
 14 parties in the case; am not in the regular
 15 employ of counsel for any of said parties; nor
 16 am I in anywise interested in the result of said
 17 case.

18 This, the 7th day of February, 2019.
 19

20 _____
 21 FRANCES BUONO, B-791
 22 Georgia Certified Court Reporter
 23
 24
 25

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2
3 Pursuant to Article 10.B. of the Rules and
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7 of the taking of the deposition stating the
8 arrangements made for the reporting services of the
9 certified court reporter, by the certified court
10 reporter, the court reporter's employer, or the
11 referral source for the deposition, with any party to
12 the litigation, counsel to the parties or other
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